

Oct. 15, 1968

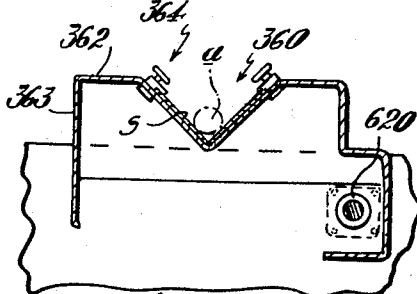
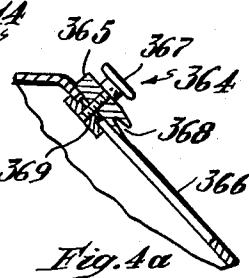
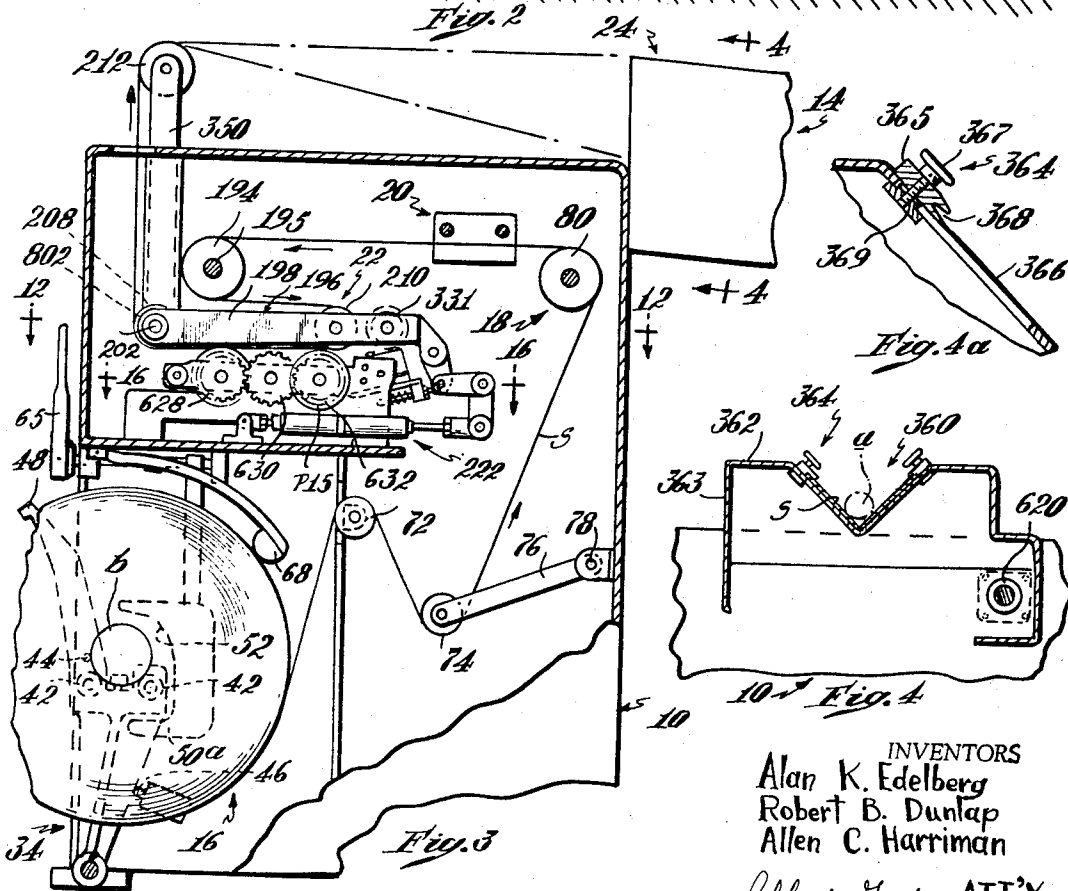
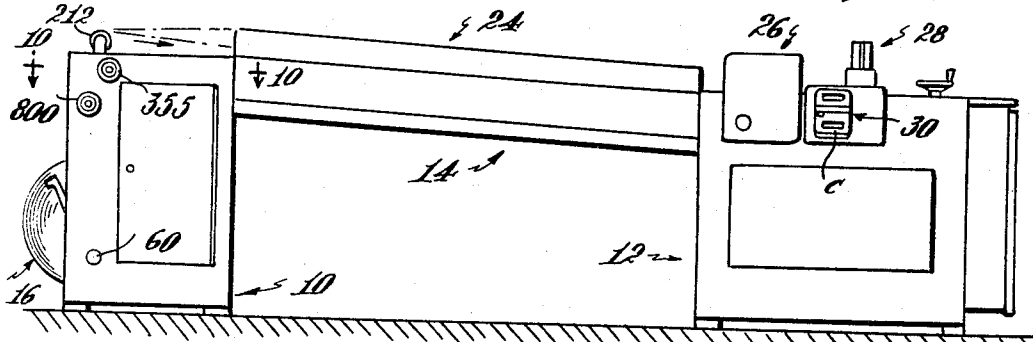
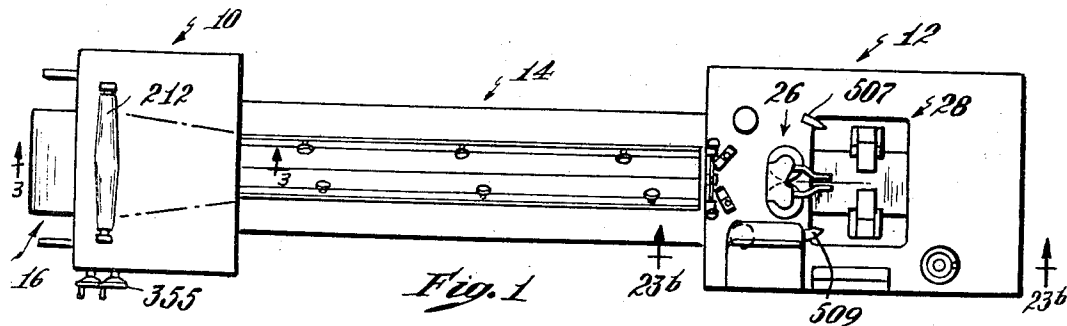
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PACKAGING MACHINE

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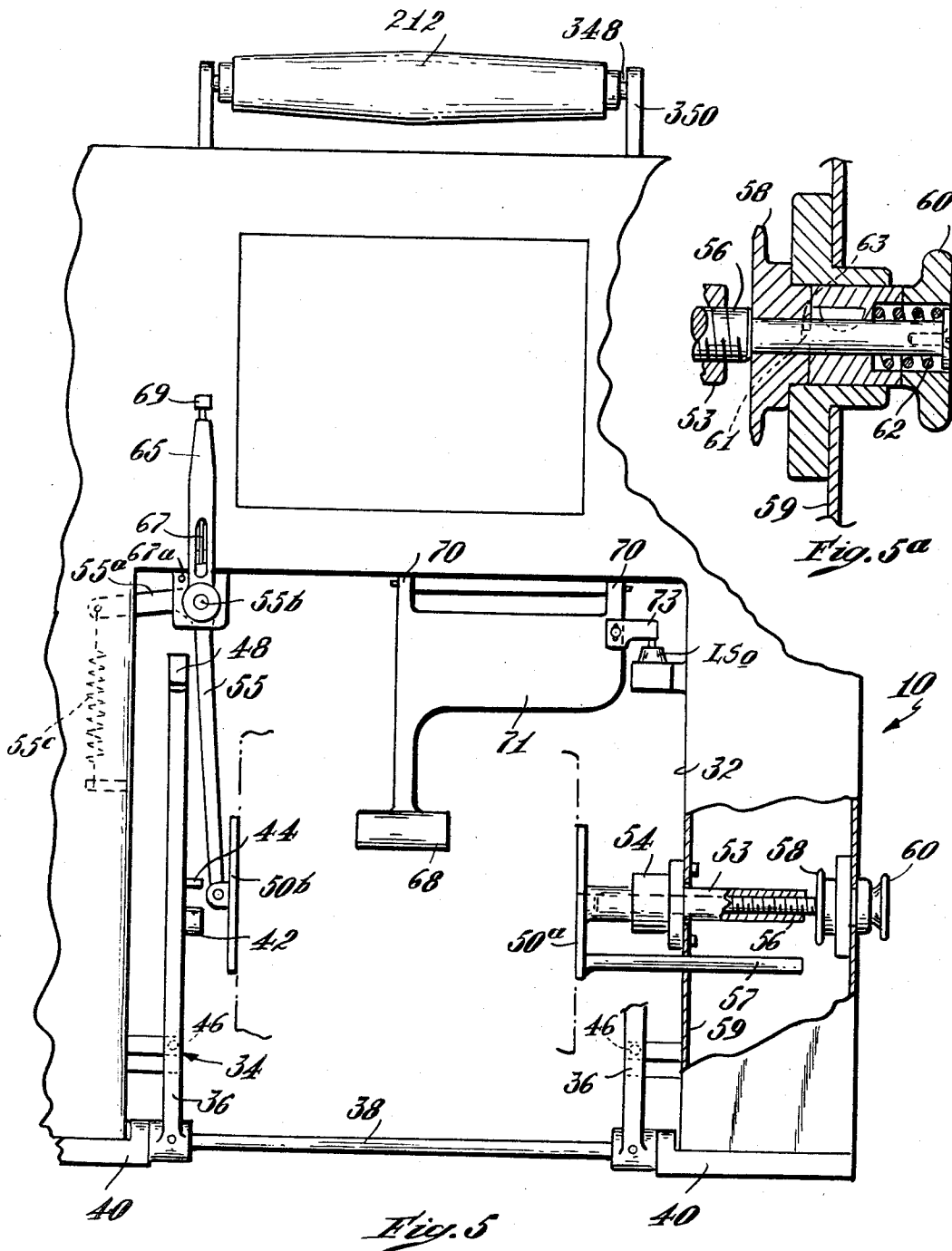
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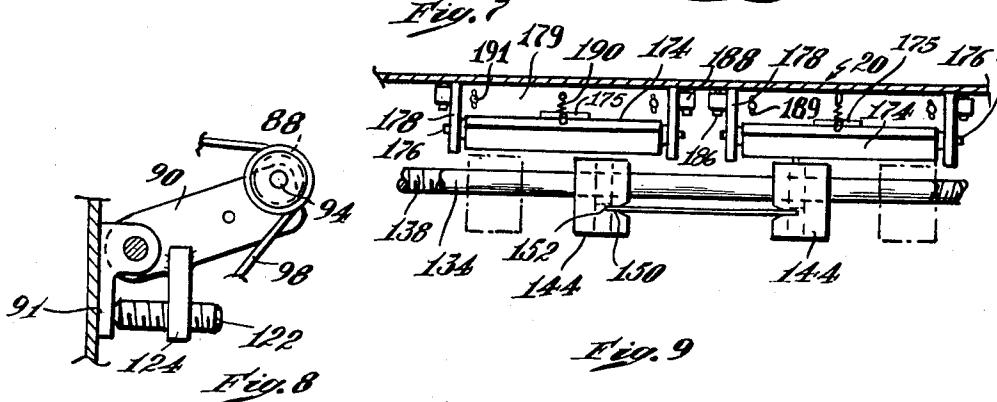
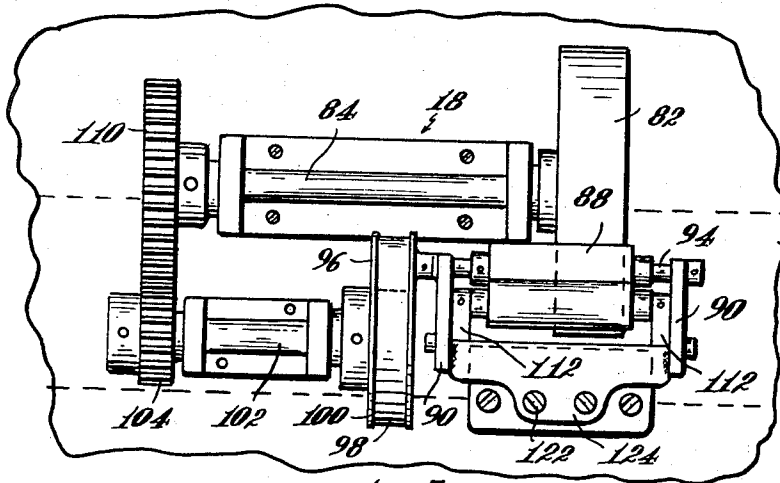
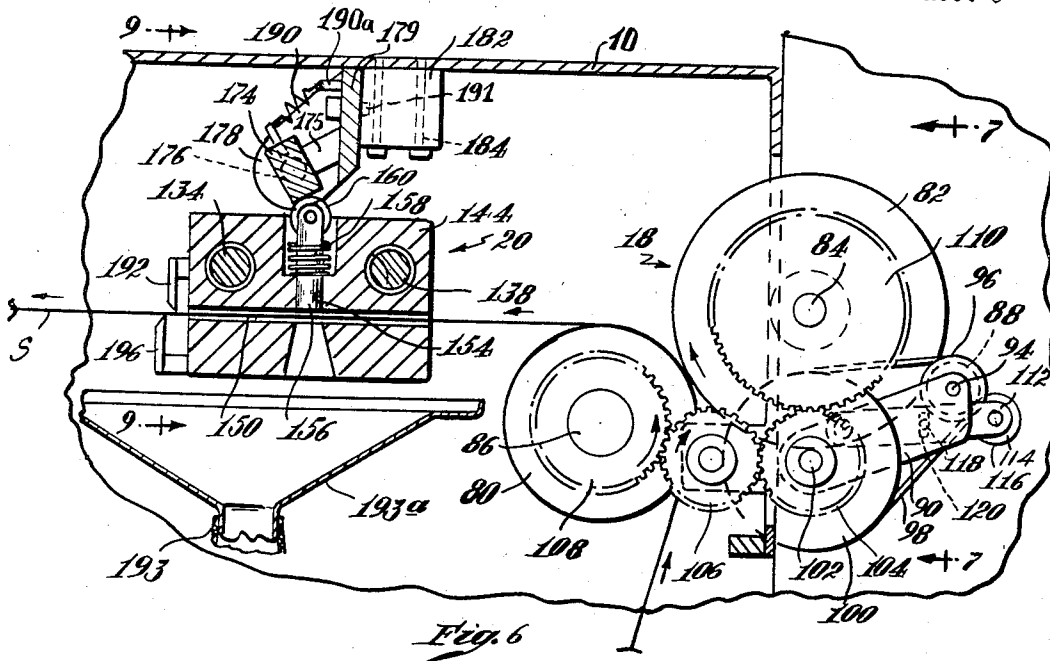
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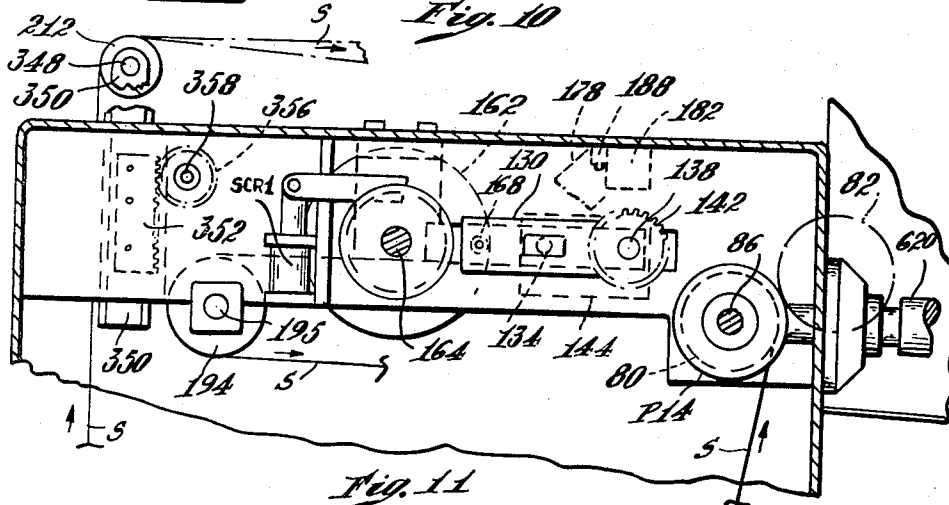
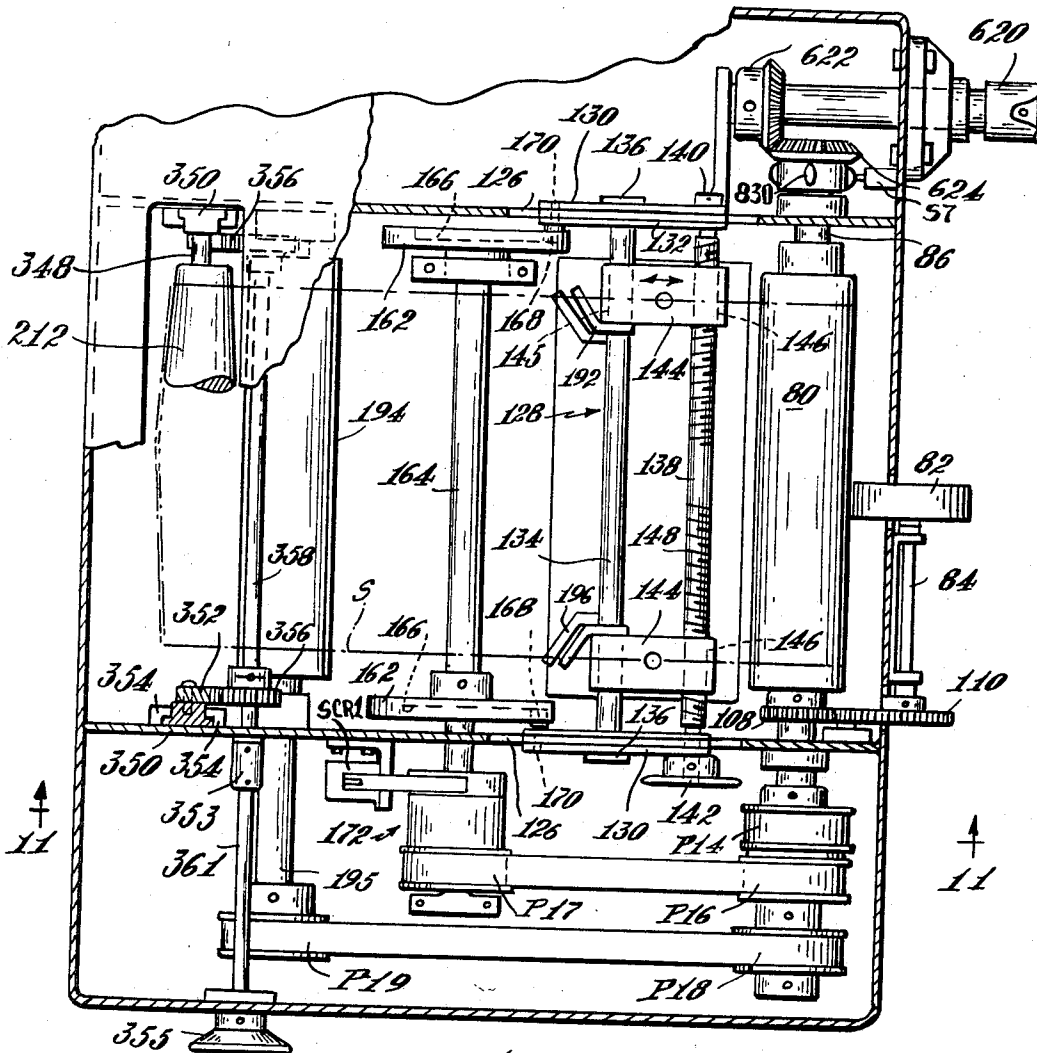
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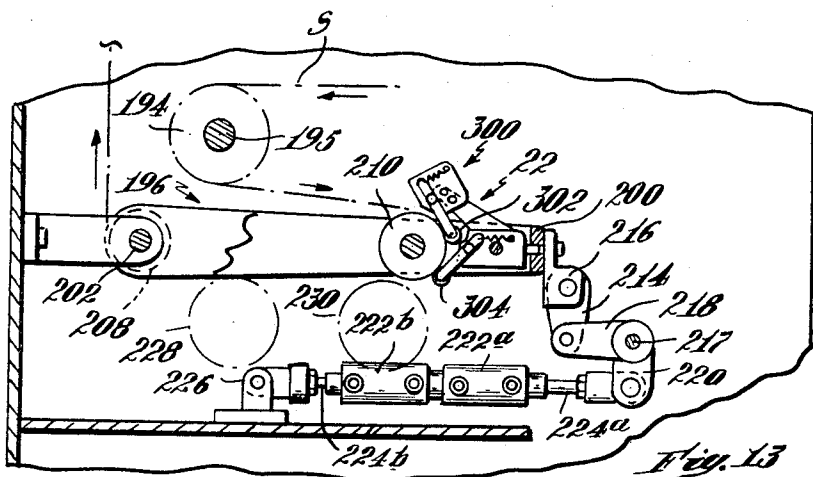
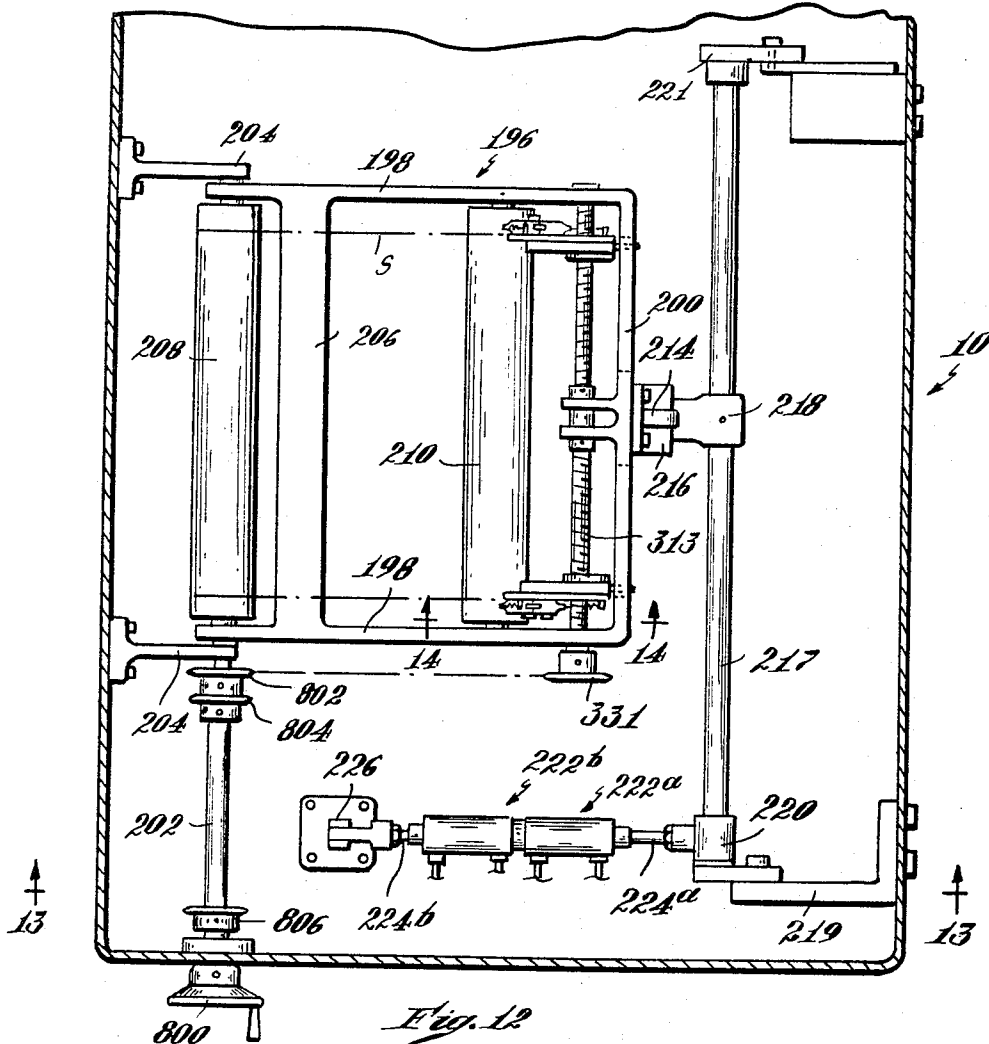
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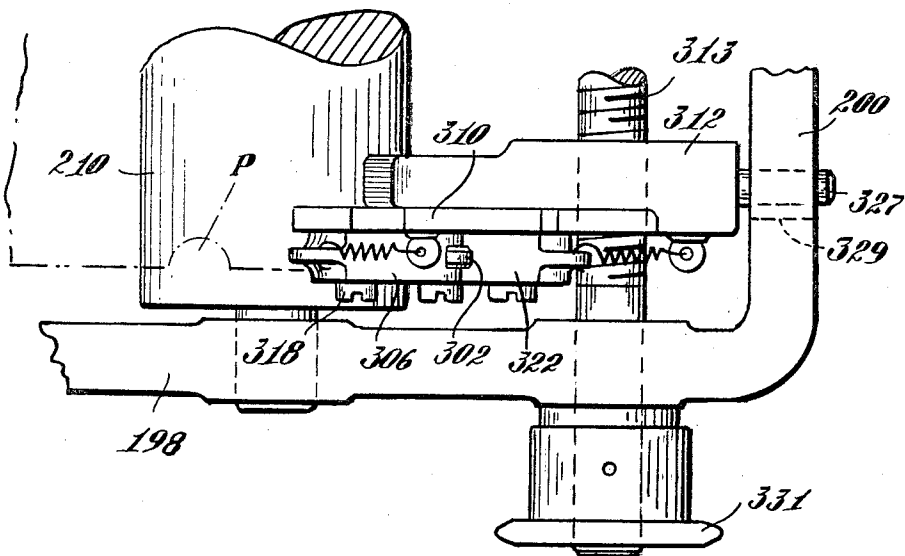


Fig. 15

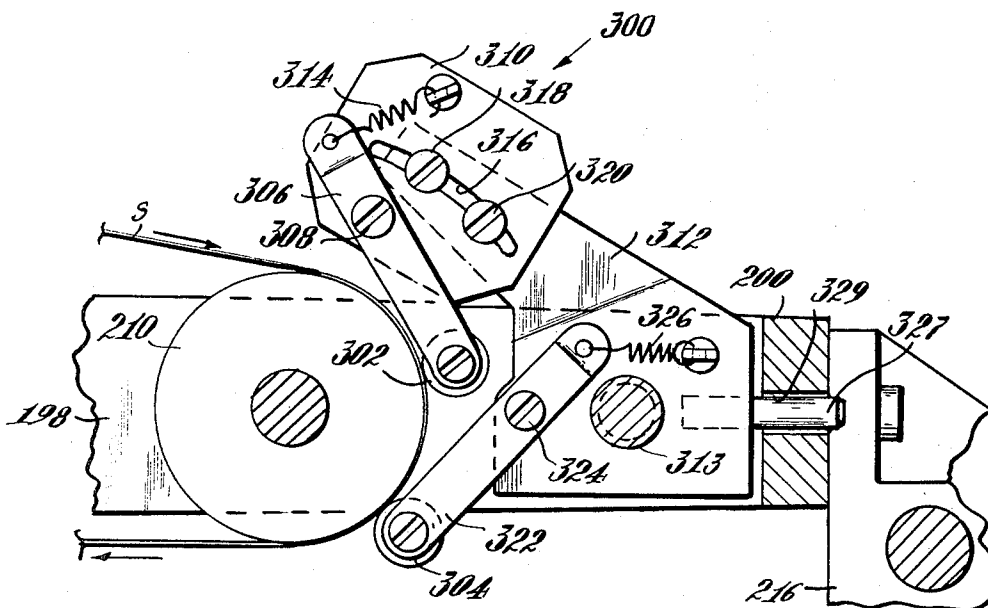


Fig. 14

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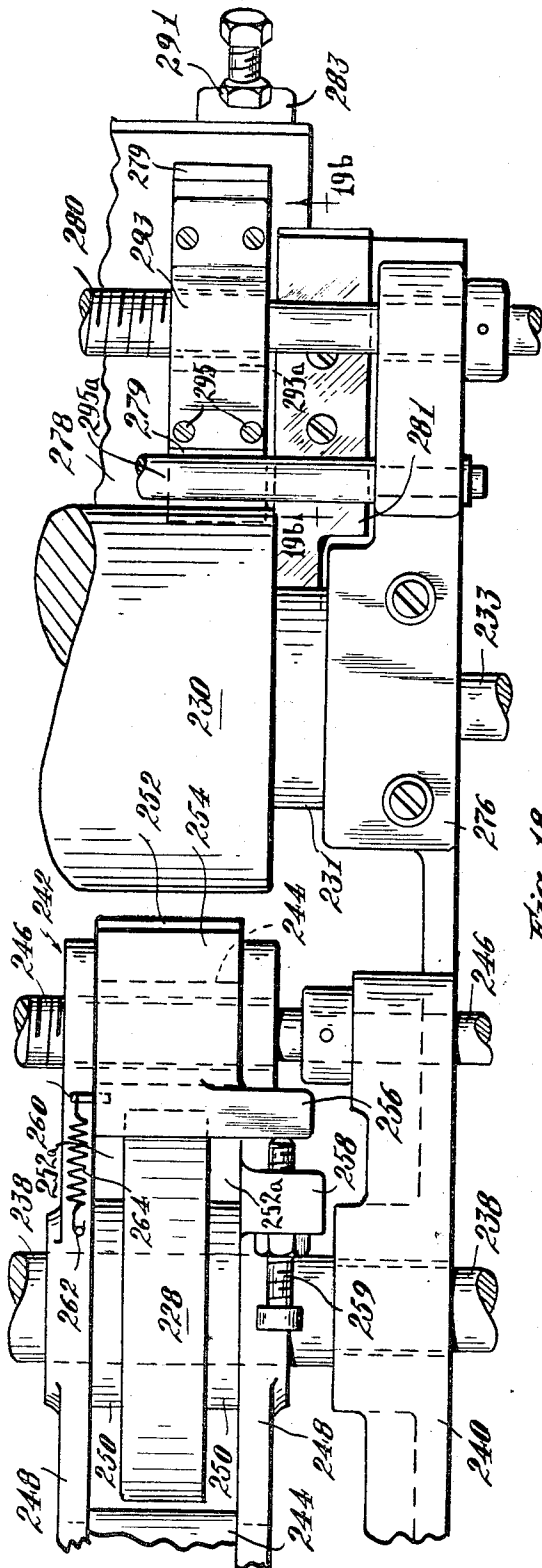


Fig. 18

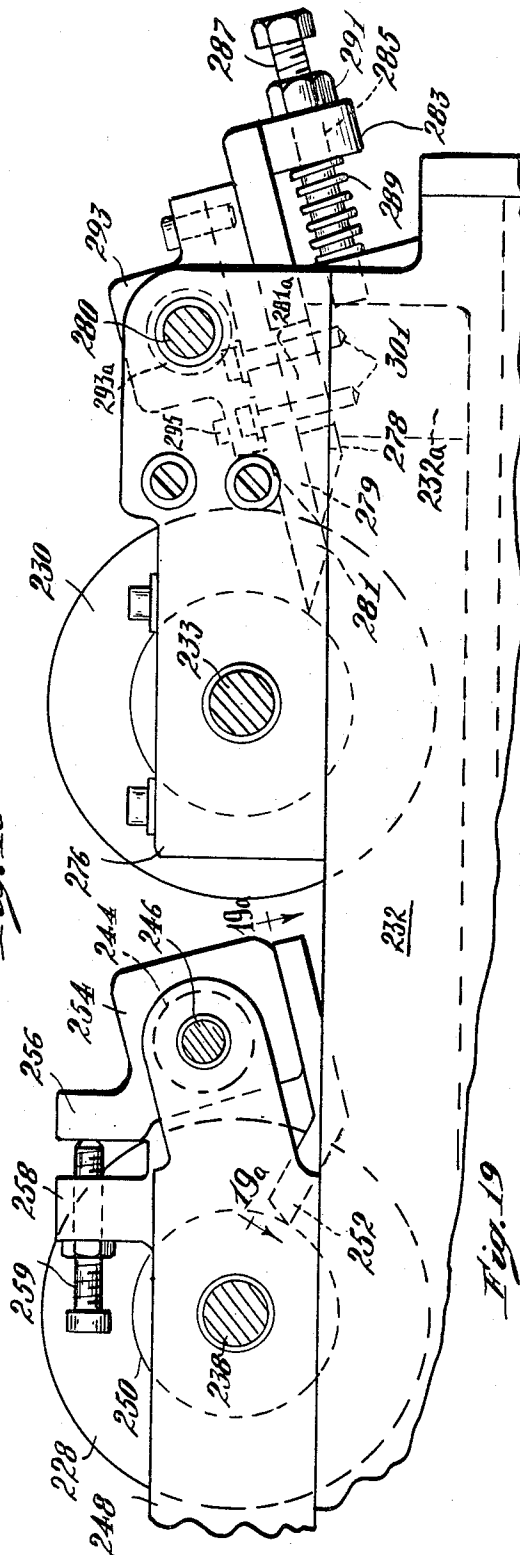


Fig. 19

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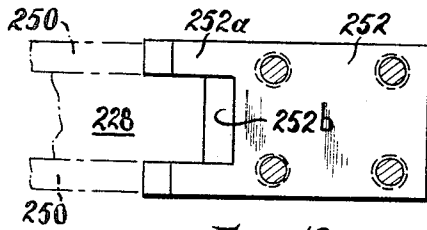


Fig. 19a

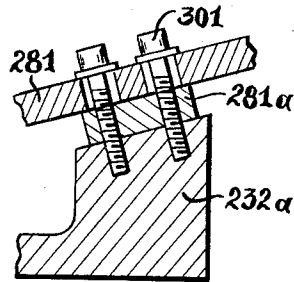


Fig. 19b

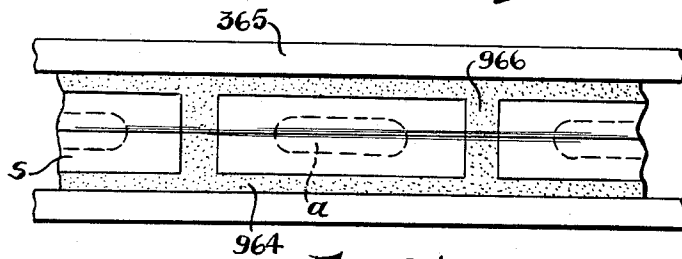


Fig. 34

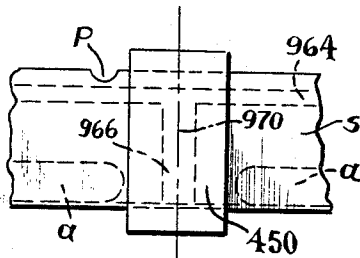


Fig. 36

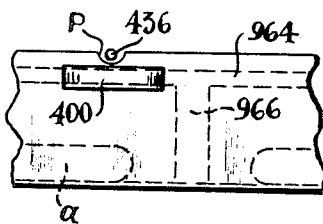


Fig. 35a

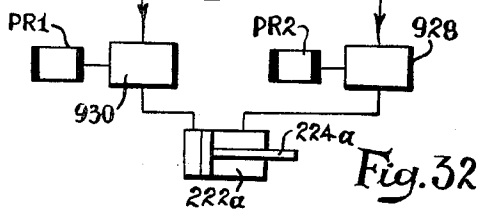


Fig. 32

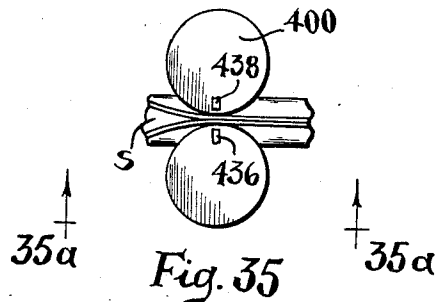


Fig. 35

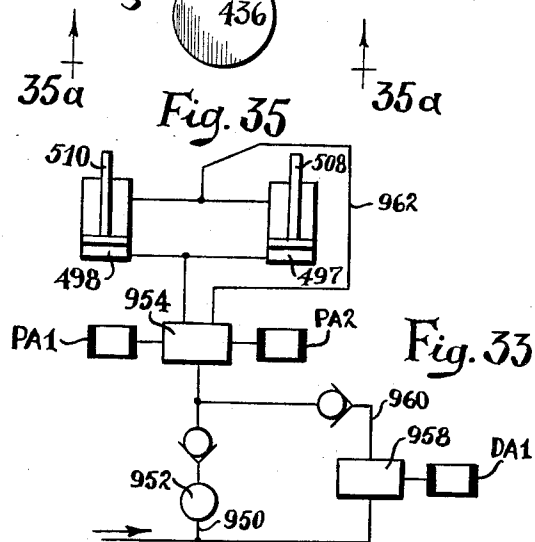


Fig. 33

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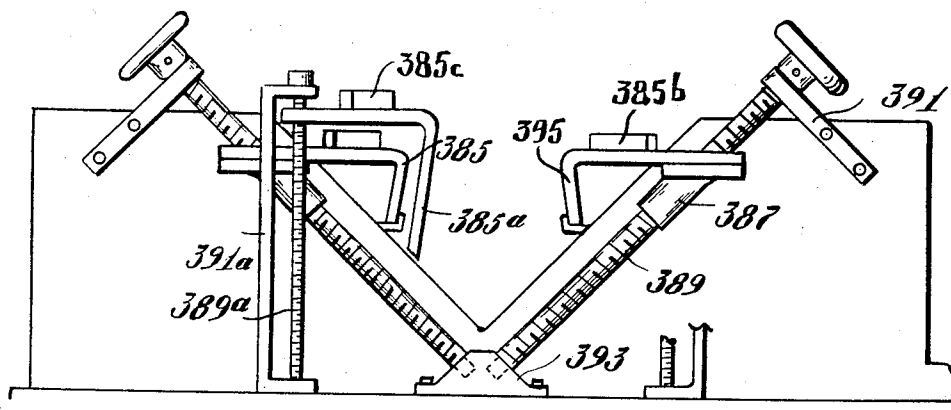
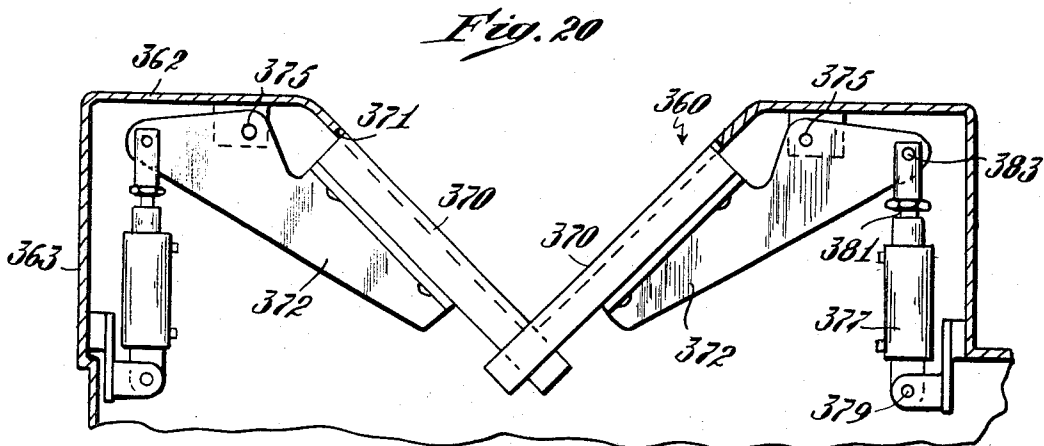
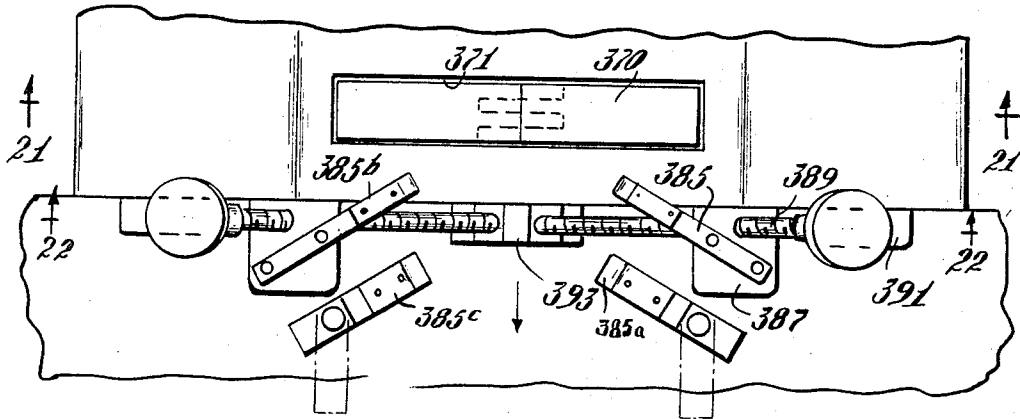
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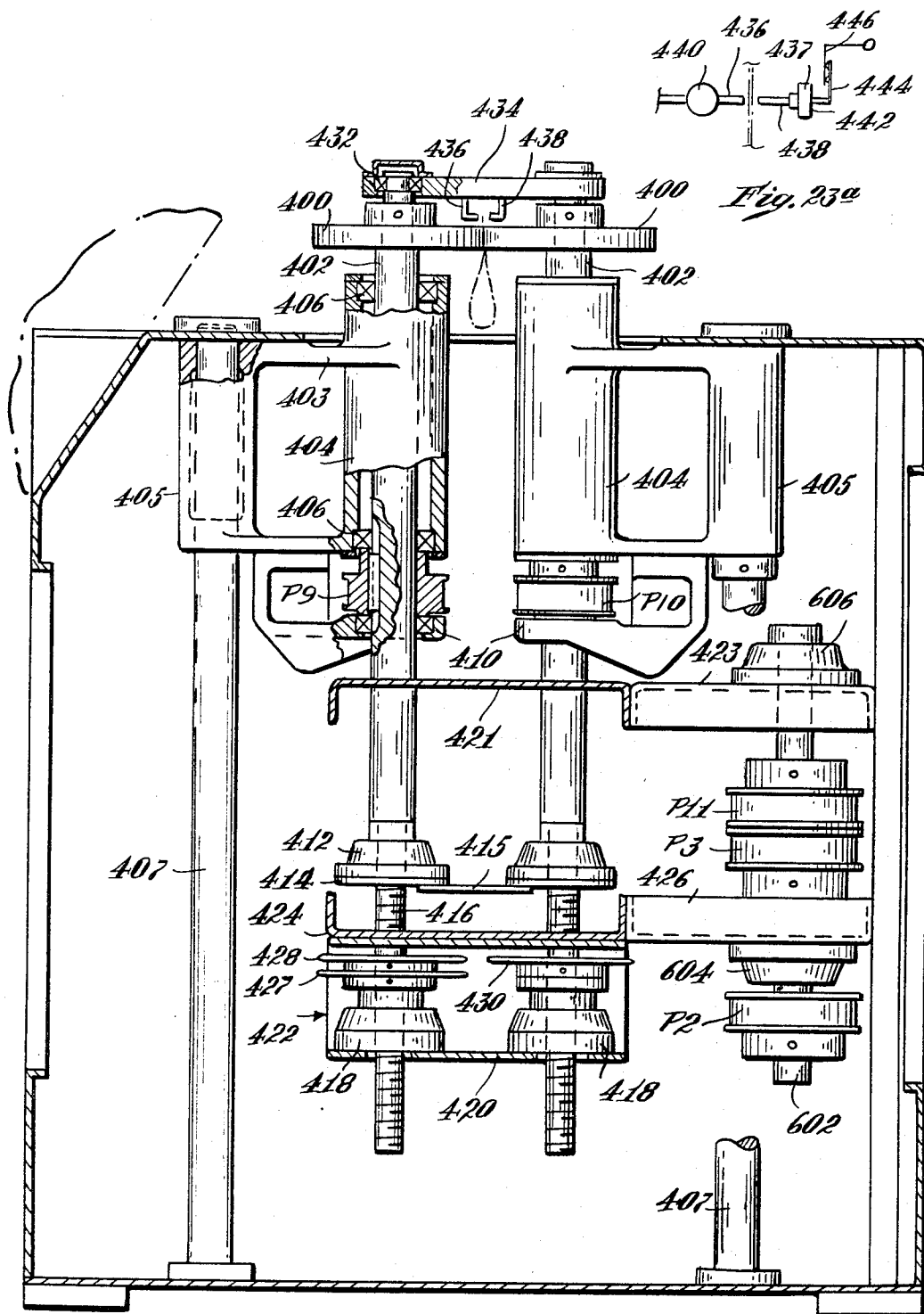
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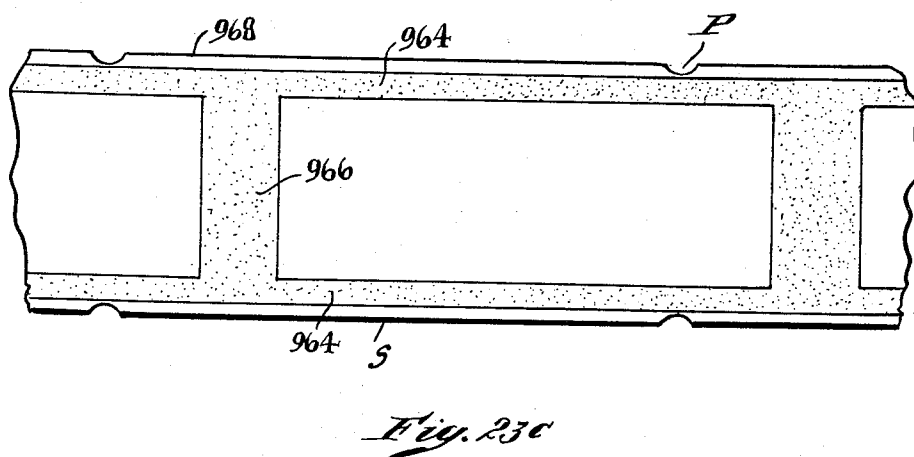
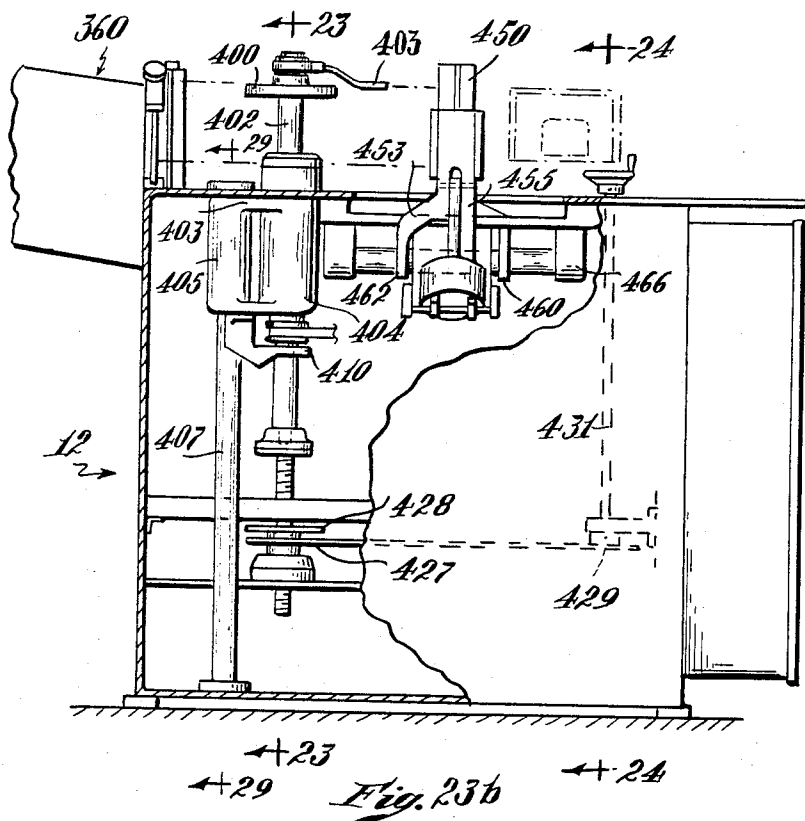
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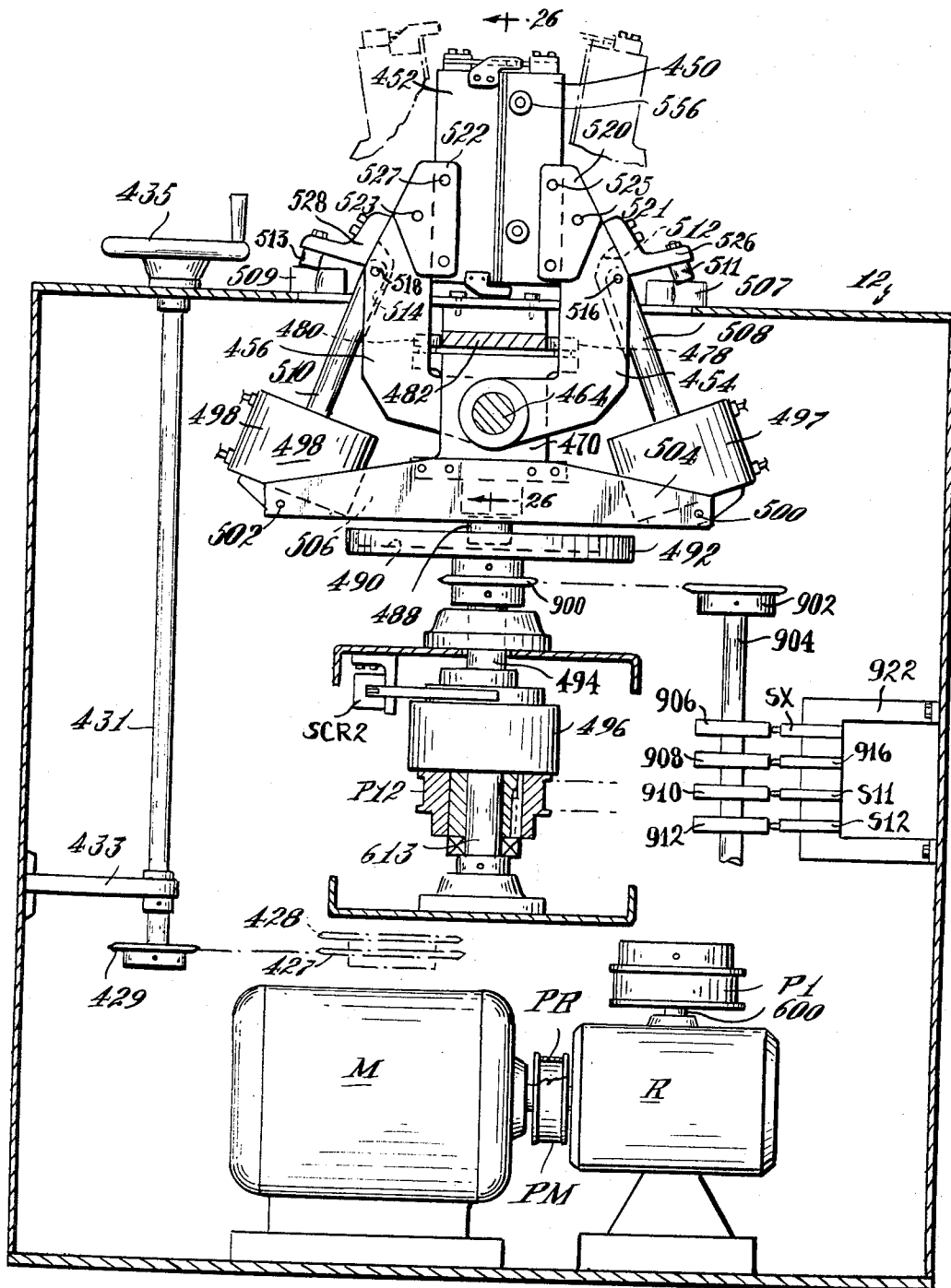


Fig. 24

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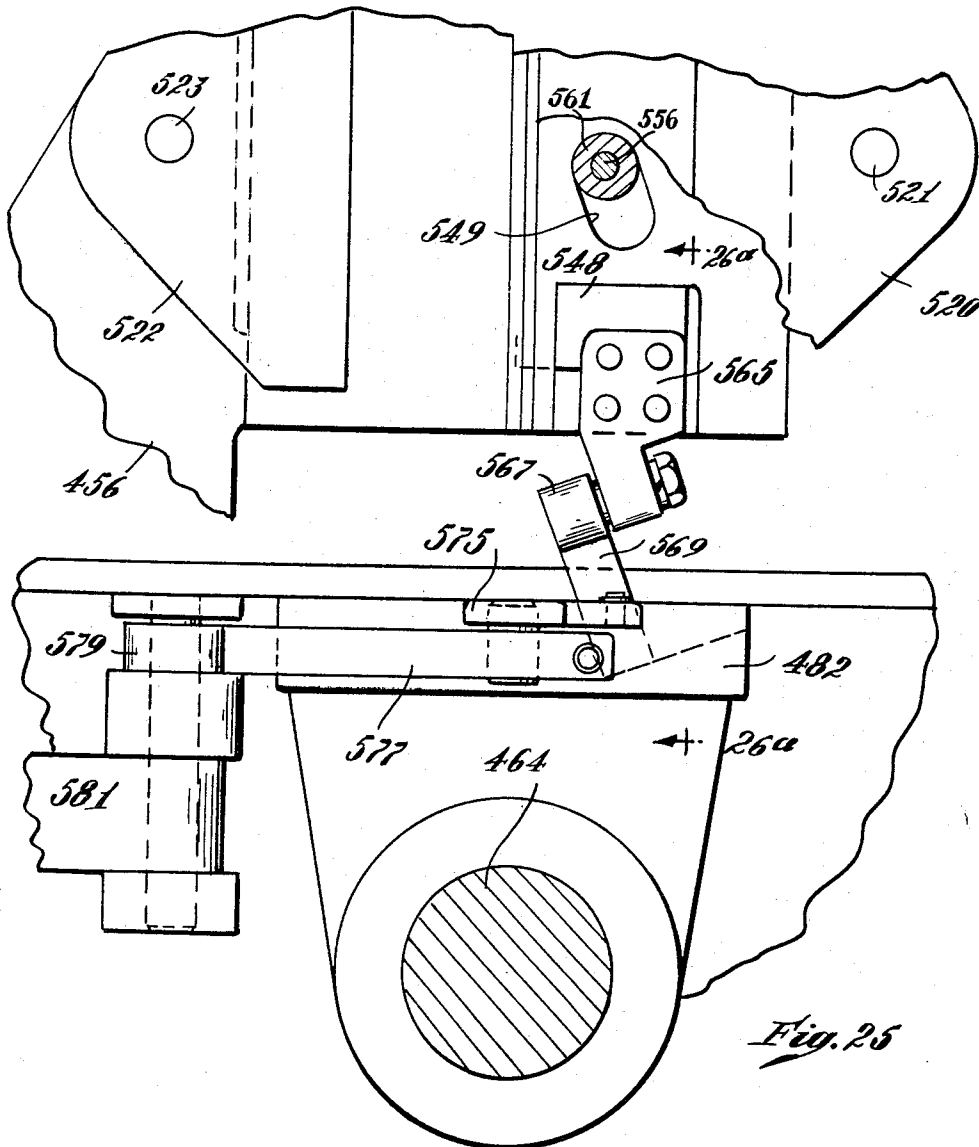
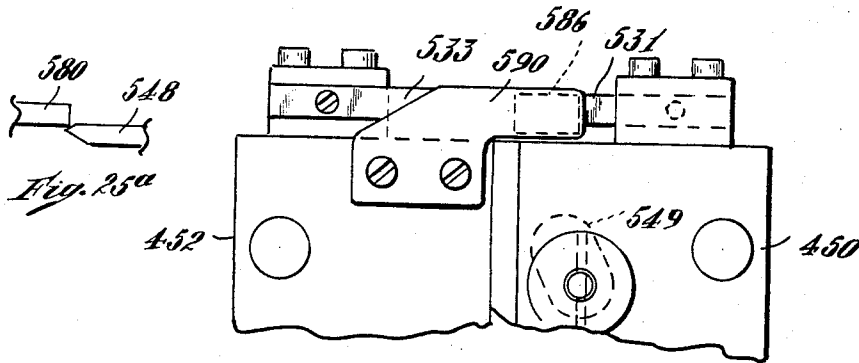
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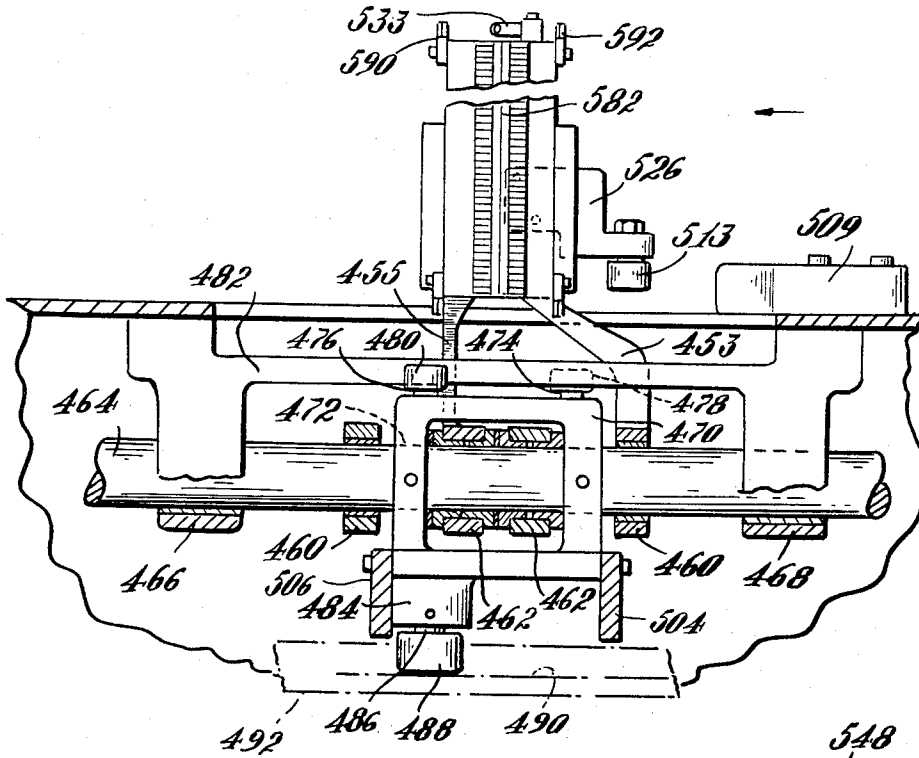


Fig. 26

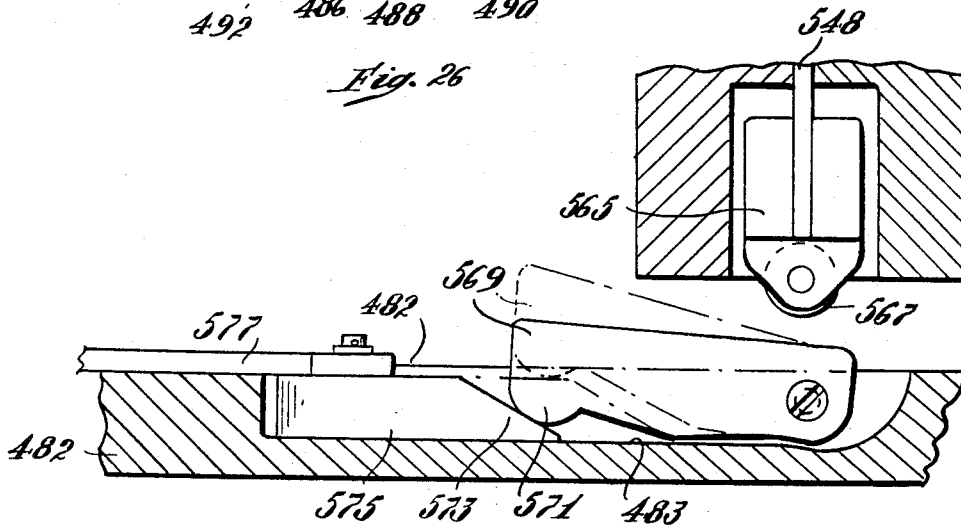


Fig. 26a

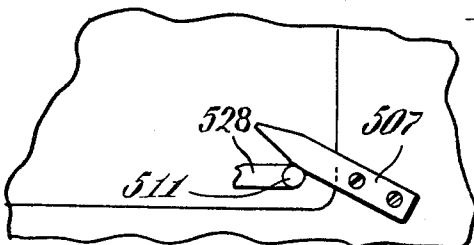


Fig. 26c

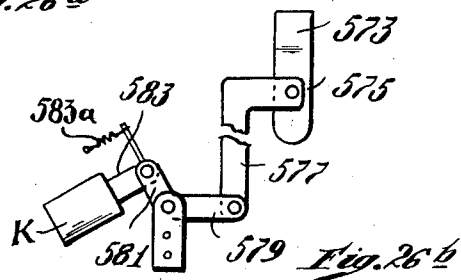


Fig. 26b

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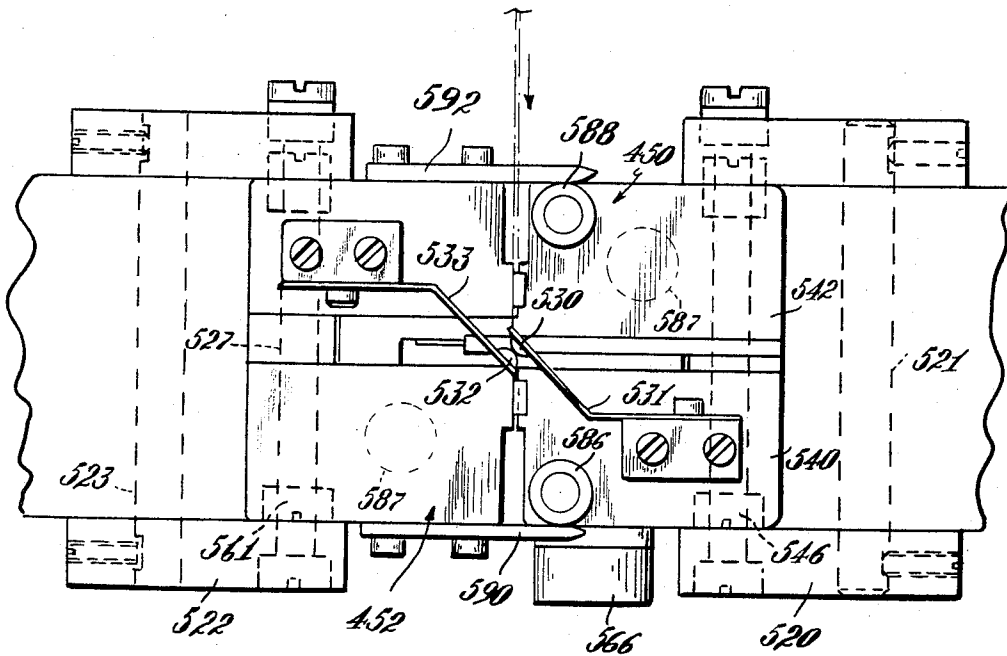


Fig. 27

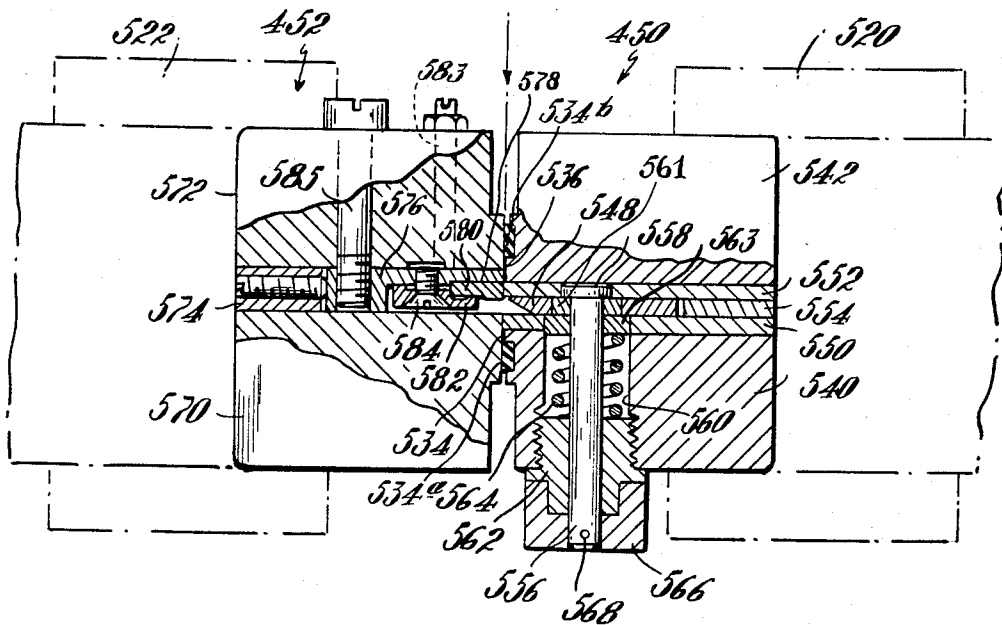


Fig. 28

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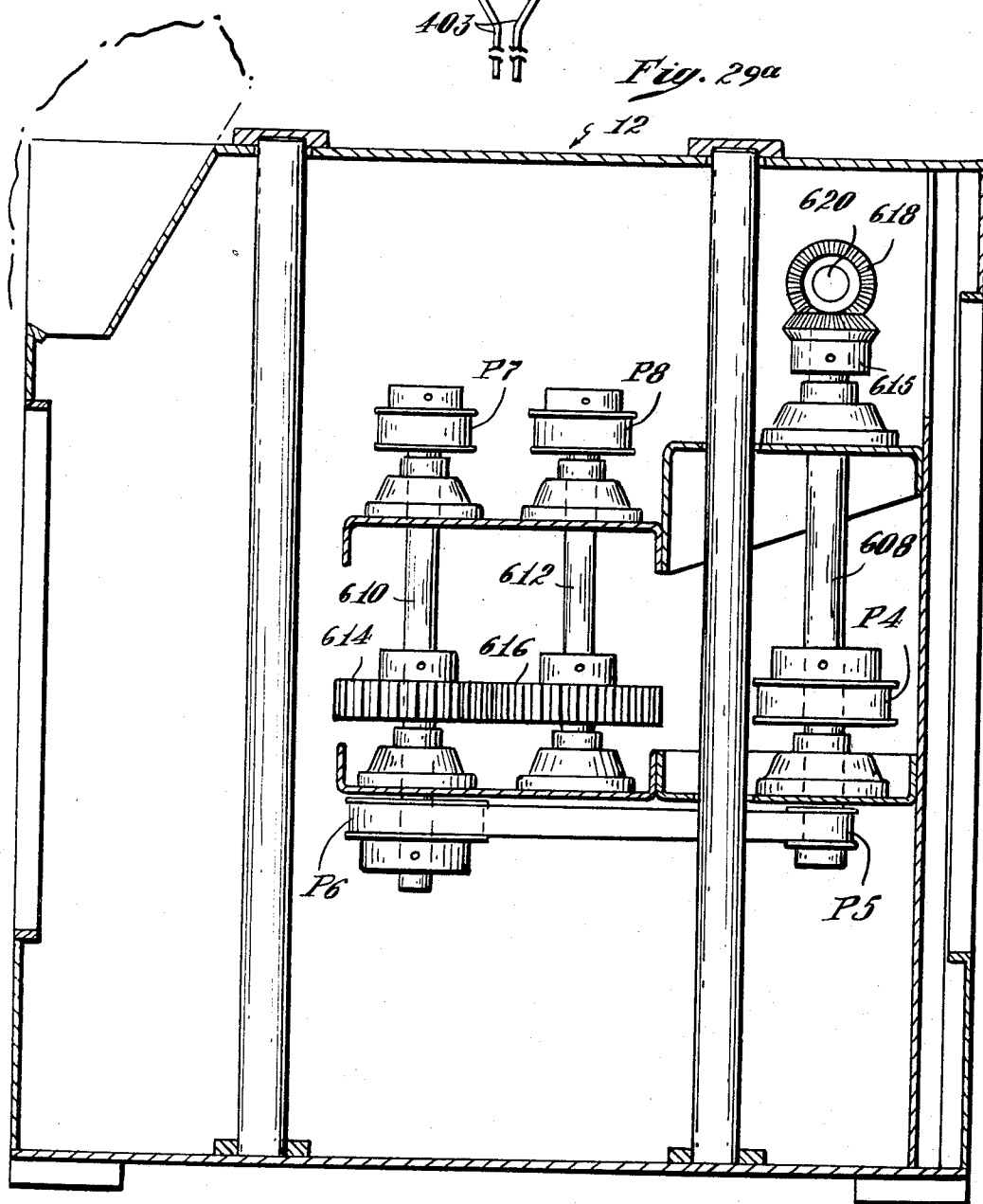
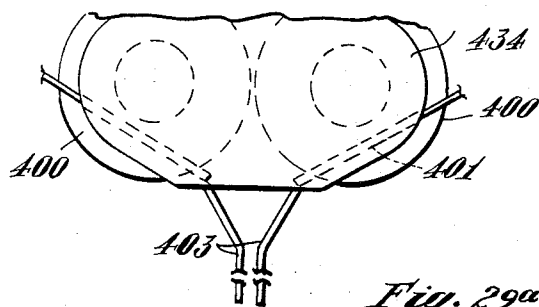
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PACKAGING MACHINE

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Filed May 19, 1964, Ser. No. 368,618

22 Claims. (Cl. 53—51)

This invention relates to packaging machines and, in particular, to machines operative to form packages from continuous strip material by partially folding the strip lengthwise to receive articles to be packaged, finish folding the partially folded strip after the articles to be packaged are placed thereon, sealing the folded strip along the edges parallel to the fold and crosswise of the fold at intervals corresponding to the length of the packages to be formed, and severing the sealed strip medially of the sealed areas.

The important objects of the invention are to provide in a machine of the foregoing kind an improved control means which enables quickly and easily changing the length of the packages to be formed for packaging articles of different length and to provide control means which is manually operative to change the length of the packages to be formed. Another object is to provide individual control of the instrumentalities at the several package-forming stations thereby minimizing the complexity of the machine and malfunctioning due to accumulative errors. Another object is to provide control of the instrumentalities at the several stations by indicia applied to the strip and to provide improved means for applying indicia to the strip at intervals corresponding to the lengths of the packages to be formed. Other objects are to provide improved means for sealing the strip with or without the aid of adhesive, to provide improved means for applying adhesive when used, to provide improved means for folding the strip to minimize the formation of wrinkles, to provide improved means for rendering the sealing means inoperative when an obstruction enters between the sealing means to prevent damage thereto, and to provide improved severing means.

As herein illustrated, the machine is provided with feeding means for pulling the strip material through the machine for operation of the package-forming instrumentalities thereon, and control means movable in proportion to the linear movement of the strip operative, in response to a predetermined movement of the strip, to effect operation of means of applying indicia to the strip. The control means is in the form of a counter which may be preset visually to indicate the length of the package to be made. In the form of the invention illustrated, adhesive is applied to the strip at intervals corresponding to the distance between indicia and the adhesive-applying means comprises spaced parallel applicator rolls for engagement with the opposite edges of the strip, a transverse applicator roll for applying adhesive to the entire width of the strip, and a strip support controlled by the indicia on the strip to hold the opposite edges of the strip continuously in contact with the spaced applicator rolls and at intervals corresponding to the distance between the indicia to press the strip into engagement with the transverse applicator roll. Operation of the strip support is effected by sensing devices which sense the indicia. The sensing devices are adjustable transversely of the strip so as to have operative engagement with the edges of the strip according to the width of the strip. The spaced applicator rolls are also adjustable width-wise of the strip so as to correspond in spacing to the width of the strip and to permit positioning them in spaced parallel relation to the edges of the strip to leave the margins outwardly

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thereof uncoated. The adhesive-coated strip is partially folded by drawing it over a guide roll into a V-shaped trough by feed rolls located at the opposite end of the trough from the guide roll. The V-shaped trough inclines downwardly from the guide roll toward the feed rolls and both the guide roll and the feed rolls are adjustable heightwise of the bottom of the trough. The feed rolls bring the edges of the partially folded strip together as it leaves the trough and beyond the feed rolls there are sealing members movable into engagement when the folded strip to press the adhesive-coated portions between them. The sealing members are reciprocable along the path of movement of the strip and there is a detector located adjacent the feed rolls operative to initiate movement of the sealing members. There are feeler elements on the sealing members operative by engagement to effect application of sealing pressure to close the sealing members and by failure of engagement due to an obstruction situated therebetween to preclude application of the sealing pressure thereby to permit the obstruction to pass through without damage to the sealing members. There is cutting means carried by the sealing members operative, when they come together, to cut off the sealed package and means operative in the absence of such engagement of the sealing members to deactivate the cutting means.

The invention will now be described in greater detail with reference to the accompanying drawings wherein:

FIG. 1 is a plan view of the machine;

FIG. 2 is an elevation of the machine as shown in FIG. 1;

FIG. 3 is an elevation, partly in section, of the housing at the left end of the machine as shown in FIG. 2;

FIG. 4 is a fragmentary section taken transversely of the machine on the line 4—4 of FIG. 3;

FIG. 4a is a fragmentary section of one side of the V-shaped trough shown in FIG. 4 to larger scale, showing an edge gauge and mounting therefor;

FIG. 5 is an end elevation, broken away in part, as seen from the left end of FIG. 2;

FIG. 5a is a fragmentary section showing the details of the knob at the right side of FIG. 5;

FIG. 6 is a fragmentary vertical section, to larger scale, showing the printing mechanism and the notching means;

FIG. 7 is an elevation taken on the line 7—7 of FIG. 6 of the printing mechanism;

FIG. 8 is a detail of an adjustment for the ink-carrying roll of the printing mechanism;

FIG. 9 is an elevation taken on the line 9—9 of FIG. 6;

FIG. 10 is a horizontal section through the housing at the left end showing the notching mechanism and portions of the drive;

FIG. 11 is an elevation taken on the line 11—11 of FIG. 10;

FIG. 12 is a horizontal section showing the support for holding the strip for application of adhesive thereto;

FIG. 13 is an elevation taken on the line 13—13 of FIG. 12;

FIG. 14 is an elevation taken on the line 14—14 of FIG. 12 to much larger scale, showing the sensing means;

FIG. 15 is a plan view of FIG. 14;

FIG. 16 is a horizontal section showing the applicator rolls;

FIG. 17 is a section taken on the line 17—17 of FIG. 16;

FIG. 17a is a diagrammatic view of three positions of the strip support relative to the adhesive applicator rolls;

FIG. 17b is a diagrammatic of the driving connections for the several operative mechanisms in the housing at the left end;

FIG. 17c is a diagrammatic of the means for adjusting the operating mechanisms for different widths of paper;

FIG. 18 is a plan view, to very much larger scale, at one side of the adhesive-applying means showing the adhesive-applying rolls;

FIG. 19 is an elevation of FIG. 18;

FIG. 19a is a section taken on the line 19a—19a of FIG. 19;

FIG. 19b is a section taken on the line 19b—19b of FIG. 18;

FIG. 20 is a plan view of a fragmentary portion of the V-shaped trough adjacent the feed rolls showing the heating elements in the walls of the trough and guides between the ends of the trough and the feed rolls;

FIG. 21 is a transverse section on the line 21—21 of FIG. 20;

FIG. 22 is a transverse section taken on the line 22—22 of FIG. 20;

FIG. 23 is a transverse section in the housing at the right end of the machine showing the feed rolls, supports and driving mechanism therefor, taken on the line 23—23 of FIG. 23b;

FIG. 23a is a diagram of a pneumatic sensing device;

FIG. 23b is a side elevation of the housing at the right end of the machine, taken on the line 23b—23b of FIG. 1, showing the feed rolls and sealing means and broken away in part to show the supporting and operating mechanism therefor;

FIG. 23c is a plan view of a length of paper with notches along its edges and adhesive applied lengthwise of each edge and at spaced intervals transversely corresponding to the length of the packages to be made;

FIG. 24 is a section taken on the line 24—24 of FIG. 23b, showing the sealing members and the drive therefor;

FIG. 25 is an enlarged elevation of the sealing means, partly in section, to show the cutter;

FIG. 25a is a transverse section of the cutting means, to larger scale;

FIG. 26 is an elevation, partly in section, taken on the line 26—26 of FIG. 24;

FIG. 26a is a detail of the knife-actuating cam taken on the line 26a—26a of FIG. 25;

FIG. 26b is a plan view of the mechanism for moving the knife-operating cam into and out of operative position;

FIG. 26c is a fragmentary plan view of the top of the housing showing one of the cams for holding the sealing member separated;

FIG. 27 is a plan view of the upper ends of the sealing members;

FIG. 28 is a plan view of the sealing members, partly in section, showing the cutting means;

FIG. 29 is a vertical section taken on the line 29—29 of FIG. 23b, showing part of the driving mechanism;

FIG. 29a is a plan view of the plate supporting the pneumatic sensing means at the upper ends of the feed rolls and showing the guides extending from the feed rolls toward the sealing members;

FIG. 30 is a diagram of a high voltage circuit forming a part of the machine control;

FIG. 31 is a diagram of a low voltage circuit forming a part of the machine control;

FIG. 32 is a diagram of an electro-pneumatic control for operating the transverse applicator roll;

FIG. 33 is a diagram of an electro-pneumatic control for operating the sealing members;

FIG. 34 is a plan view of the strip as it passes through the V-shaped trough;

FIG. 35 is a plan view of the strip as it passes through the feed rolls;

FIG. 35a is a view taken on the line 35a—35a of FIG. 35; and

FIG. 36 is a view of the strip as it is engaged by the sealing members.

Referring to FIGS. 1 and 2, which illustrate the overall configuration of the packaging machine in plan and elevation, the frame supporting the operative mechanism is generally elongate comprising two housings 10 and 12

of rectangular cross-section, rigidly joined in spaced relation to each other by a bridge 14.

Commencing at the left end of the machine (FIG. 3), a strip of paper, or the like, S of suitable width, supplied in the form of a roll 16, mounted in the housing 10 is drawn from the roll through a printing station 18, an indicia-applying station 20 and an adhesive-applying station 22, all located in the housing 10, to a station 24 for partial folding of the strip along a longitudinal median and disposition of articles to be packaged therein, and from thence to a station 26 for final folding and a station 28 for sealing and cutting into individual packages, the latter being located in the housing 12. The housing 12 also includes the drive for the entire machine and supports a control panel 30 by means of which the package size can selectively be set up.

The support for the strip, as previously mentioned, is located in the housing 10, the latter being provided for this purpose with a substantially rectangular opening 32 in its outer end wall (FIG. 5) of suitable width and height to receive the roll 16 of paper which is to be used. To facilitate mounting the roll in position, the support for the paper roll is in the form of a frame 34 comprised of spaced parallel arms 36 pivotally mounted at one end on a horizontal shaft 38, the ends of the shaft 38 being pivotally mounted in bearing members 40 secured to the base of the housing at opposite sides of the opening 32. Pairs of roller bearing supports 42 are mounted on the arms 36 at their inner sides in spaced parallel relation for supporting the lower side of the beam b on which the paper is wound to permit free rotation of the beam during unwinding of the paper. A pair of lifting studs 44 (FIG. 3) are secured to the inner sides of the arms above the bearing supports and cooperate with the bearing supports when the frame is swung outwardly from the housing to a prone position for receiving a roll of paper to hold the latter in position until the frame is lifted to its upright position. Adjustable stops 46 are secured within the opening forwardly of the frame 34 operative, by engagement with the forward sides of the arms 36, to limit its position, and the arms are provided with rearwardly bent handles 48 to enable manipulation of the frame for the purpose of lifting and lowering to replenish the machine with paper.

Within the opening 32 adjacent each side shield plates 50a and 50b are mounted adjacent the ends of the roll of paper.

The plates contain recesses 52 so that they partially encompass the forward side of the beam b. As illustrated, the right-hand shield plate 50a (FIGS. 3 and 5) is secured to the inner end of a hollow shaft 53, the latter being mounted in a bearing 54 secured to the housing for axial movement in the bearing and being threaded internally onto a screw 56. The outer end of the screw has mounted on it a knob 60 by means of which the screw may be rotated to move the plate 50a transversely to adjust the spacing between the plates according to the width of the paper. A guide bar 57, secured at one end to the plate 50a and extending outwardly therefrom through a hole in a fixed part 59 of the housing 10, prevents rotation of the plate when the screw 56 is rotated to effect an adjustment. A sprocket 58 is mounted on the screw 56 for rotation thereon and, as will be described hereinafter, provides means for adjusting plate 50a in consonance with all of the instrumentalities which operate on the paper and which have to be repositioned in accordance with changes in the width of the paper. To enable adjustment of the plate 50a independently of the other instrumentalities to compensate for irregularities in the coil of paper, the knob 60 is splined to the screw 56 and has at one end dogs 61 interengageable with notches 63 in the hub of the sprocket 58. A spring 62 normally holds the knob engaged with the sprocket. However, if it is desirable to rotate the screw 56 without rotating the sprocket, the knob 60 may be pulled out to disengage the dogs from the notches. Rotation of the knob when

disengaged from the sprocket will rotate the screw without rotating the sprocket 58.

The left-hand shield plate 50b is pivotally mounted at the lower end of an arm 55. The upper end of the arm 55 is fixed to a stub shaft 55b, one end of which is supported in a boss at the top of the opening 32 so that the arm is swingable about the pivot toward and away from the right-hand shield plate 50a. A limb 55a extends from the left side of the arm 55 and a spring 55c, connected at one end to the limb and at its other end to the housing, urges the arm in a counterclockwise direction (FIG. 5) so as to press the plate 50b against the end of the roll of paper. A handle 65 is fixed on the stub shaft 55b and is provided with a latch 67 operable by a thumb piece 69 to engage the latch with a lug 67a to hold the arm away from the end of the roll of paper when loading the paper support. The left-hand shield plate 50b normally holds the roll of paper engaged with the right-hand shield plate, the position of the latter being determinative of all of the operating instrumentalities throughout the machine.

A paper supply detector in the form of a cylindrical feeler 68 is supported within the opening 32 on a plate 71 suspended by spaced parallel arms 70 from the top of the opening so as to rest on top of the roll of paper and to move toward the axis of the roll of paper as the diameter decreases. When the feeler 68 reaches a position indicative that the paper supply is close to depletion, an adjustable lug 73 on the plate 71 actuates a limit switch LSO which stops the machine as will be shown hereinafter. By adjustment of the lug 73 through a slot and bolt connection, the point at which the machine is stopped may be controlled.

Referring to FIG. 3, the paper which will be referred to hereinafter as the "strip S" is drawn off the underside of the roll of paper within the housing 10 over an idler roll 72 mounted within the housing, above the center of the support for the roll, and thence around a slack take-up roll 74 which is mounted between a pair of spaced parallel arms 76, the latter being pivotally supported at 78 on the inner wall of the housing 10. The strip S passes from the slack take-up roll 74 upwardly to the printing station 18 over the upper side of a horizontally disposed roll 80 and from thence rearwardly to the indicia applying station 20. The roll 80 provides a rotary platen for supporting the strip for printing which is applied thereto continuously in successive repeats. For printing a type-carrying roll 82 (FIG. 6) is mounted on a shaft 84 parallel to the shaft 86 of the platen roll for tangential engagement of its peripheral surface with that of the platen roll. The type-carrying roll 82 is narrow from side-to-side, as shown in FIG. 7, and is supported at one side of the longitudinal center line of the strip so that the printing will be applied at one side of the fold which is to be made in the strip for forming the package as will be described hereinafter. Type of an appropriate composition are mounted on the type-carrying roll 82 and ink is applied to the face of the type by a roll 88 (FIG. 6) supported between a pair of spaced parallel arms 90, with its surface tangentially engaged with the type-carrying roll 82. The arms 90 are pivotally supported by a bracket plate 91 (FIG. 8). A shaft 94 pivotally mounts the roll 88 between the arms 90 and has fixed to it a pulley 96 about which is entrained one end of a belt 98. The other end of the belt 98 is entrained about a pulley 100 fixed to a shaft 102 and the latter is rotated by meshing gears 104, 106 and 108, the gear 104 being fixed to the shaft 102 and the gear 108 being fixed to the shaft 86. The gear 106 is an idler. The type-carrying roll 82 is rotated by a gear 110 which meshes with the gear 104. A pair of spaced parallel arms 112 are pivotally supported on the arms 90 and support at their distal ends an ink-carrying roll 114 which bears against the surface of the roll 88 and supplies the latter with ink which, in turn, transfers it to the type on the type-carrying roll. The ink-carrying roll 114 conveniently is provided with an absorbent surface layer 116 which holds a quantity of printing ink.

The ink-carrying roll is adjustable relative to the roll 88 to vary the pressure and hence the amount of ink transferred and is secured in position by thumb screws 118 which may be tightened within slots 120 in the arms 90. The arms 90 are, in turn, adjustably mounted to permit varying the pressure between the roll 88 and the roll 82 by means of screws 122 (FIG. 8) threaded through a plate 124 and bearing against the bracket plate 91, the latter being welded between the arms so that by rotating the screws 122, the angular position of the arms may be varied. As illustrated, the inner wall of the housing 10 is cut away to make room for the printing mechanism.

Following printing the strip S passes rearwardly in a nearly horizontal position (FIG. 6) to the station 20 for application of indicia thereto which takes the form of notches cut in the longitudinal edges of the strip. Notches P of half-circular shape are formed in the edges as shown in FIG. 23c; however the shape of the notches is not critical since other shaped notches may be employed with equal success depending upon the character of the package to be formed and the material of which it is made. It is these notches P which control successive operations in the machine so as to enable varying the package length at will. At the indicia-applying station 20 the side walls of the housing contain horizontally disposed bearing slots 126 (FIGS. 10 and 11) which support a carriage 128 for reciprocable movement. The carriage comprises a pair of plates 130 having bearing shoulders 132 at their inner sides engaged within the slots 126 and secured together so as to move in unison by a transversely extending shaft 134, the ends of which extend through the plates. The ends of the shaft 134 are hexagonal and fit into corresponding hexagonal openings in the plates 130 so as to prevent rotation thereof. Cover plates 136 are secured to the outer sides of the plates 130 over the ends of the shaft. Forwardly of the shaft 134 and parallel thereto there is a traverse shaft 138, the ends of which are rotatably supported in the plates 130. One end of the traverse shaft 138 has a collar 140 fixed thereto and the other end a sprocket 142 by means of which it may be rotated. Punch carrying blocks 144 are mounted on the shafts 134 and 138. The rear ends of the punch blocks contain openings 145 for sliding along the shaft 134 and the forward ends of the punch blocks contain right and left-hand threaded openings 146 for receiving right and left-hand threads 148 on the traverse shaft 138. Each of the blocks 144 contains lengthwise thereof and between its top and bottom a horizontally disposed slot 150 (FIGS. 6 and 9) through which an edge of the strip moves as it is advanced through the indicia-applying station. The slots 150 are cut from the inner sides of the blocks outwardly and their outer ends 152 provide guides for the strip and are adjustable by rotation of the traverse shaft 138 to correspond to the width of the strip being used. Each of the blocks 144 contains a vertically disposed hole 154 (FIG. 6) which extends downwardly through the slot 150. Punches 156 are mounted in the holes 154 and are normally held with their lower ends above the slots 150 by springs 158. Rollers 160 are mounted at the upper ends of the punches and provide means, as will appear hereinafter, to depress the punches at an appropriate time and hence to cut notches in the edges of the strip. The machine is designed for continuous rather than intermittent operation so that notching must be effected while the strip is moving. In order to perform the cutting operation on the moving strip, the carriage 128 supporting the punches must be moved forwardly from a standstill up to a speed corresponding to the speed of the strip. Reciprocable movement of the carriage 128 for this purpose is effected by a pair of cam plates 162 (FIGS. 10 and 11) fixed to a shaft 164, the latter being journaled at its opposite ends in the sides of the housing. The cam plates contain cam grooves 166 within which cam followers 168 are engaged, the followers being rotatably mounted on studs 170 secured to the

forward ends of the plates 130. The cam grooves are designed to effect forward and rearward movement of the carriage for each single rotation of the cam, first to initiate forward movement of the carriage, then to bring it up to the speed of the strip, and finally to return it to its original position for the next operation. Rotation of the shaft 164 is provided for by a one-revolution clutch 172, the operation of which will be described hereinafter.

At the place where the carriage attains the speed of the strip, there are cam bars 174 (FIGS. 6 and 9). The cam bars 174 are of rectangular cross-section and are secured at their ends on pivot pins 176, the latter being pivotally supported between spaced parallel bracket arms 178 that depend from the opposite ends of bracket bases 179. The bracket bases 179 contain slots 189 for receiving bolts 191. The bolts 191 are threaded into a bar 182, the latter being fastened by screw bolts 184 to the underside of the top of the housing 10. The bracket arms 178 have bosses 188 formed on them. Stud 186 extending through and threaded into the bosses 188 bear against the underside of the top of the housing 10. Thus the heightwise position of the cam bars 174 relative to the blocks 144 may be effected by loosening the bolts 191, adjusting the positions of the studs 186 in the bosses 188, raising the bracket bases 179 until the studs 186 bear against the top of the housing 10 with the bolts 191 riding in the slots 189, and then tightening the bolts 189. Springs 190, connected at one end to each of the cam bars 174 and at their opposite ends to eye bolts 190a that are threaded into the bracket bases 179, normally hold the cam bars 174 against stops 175 that project rearwardly from each of the bracket bases 179, in which position the lower ends of the cam bars are situated below the level of the upper sides of the rollers 160. Hence when the carriage moves rearwardly the rollers 160 pass under the lower ends of the cam bars 174 and are depressed thereby to effect downward movement of the punches and hence notching of the strip. During the return movement of the carriage, the rollers 160 pivot the cam bars 174 counterclockwise (FIG. 6) so that they pass beneath them whereupon the springs 190 restore the cam bars to their operative position for the succeeding notching operation.

As the strip leaves the indicia-applying station, it is desirable to clear it of any pods which may be still partially attached to it or carried thereby to prevent their being carried into the cement receptacle at the cement-applying station. Hence at the rear ends of the slots 150 there are vertically spaced wiper blades 192 and 196 (FIGS. 6 and 10) disposed so as to scrape the pods from the strip by respectively engaging the top and bottom of the strip. The wiper blades 192 and 196 are secured to the blocks 144 so as to move with them and are horizontally displaced relative to each other as shown in FIG. 6. Preferably the wiper blades diverge with respect to the rear sides of the blocks rearwardly. A tray 193a is mounted below the carriage which is of sufficient length to lie under the carriage throughout its reciprocable movement. The tray has downwardly sloping bottom walls providing a funnel and a bag 193 is attached to the lower end of the funnel to catch the pods and thus to permit ease in removing and disposing of them.

The strip S passes from the indicia-applying station 20 over a guide roll 194 (FIGS. 3, 10, 11 and 13) mounted on a shaft 195, the ends of which are journaled in the sides of the housing in a horizontal position and about its underside to the adhesive applying station 22 for application of adhesive to the longitudinal edges and crosswise thereof at intervals corresponding to the length of the packages to be formed as controlled by the notches made in the preceding station (FIG. 23c). At the adhesive-applying station there is a pivotally mounted support 196 (FIGS. 12 and 13) comprised of spaced parallel bars 198 joined at their forward ends by a transverse bar 200 and pivotally mounted at their rear ends on a shaft 202, the latter being journaled in brackets 204 bolted or

otherwise secured to the outer wall of the housing. A crossbrace 206 is formed integral with the bars 198 intermediate their front and rear ends. A support roll 208 is mounted on the shaft 202 between the bars rearwardly of the crossbrace 206 and a support roll 210 is pivotally mounted between the bars 198, forwardly of the crossbrace 206. The strip S, as it leaves the guide roll 194, extends forwardly over, about and beneath the support roll 210 and then rearwardly about the underside of the support roll 208, and finally upwardly to a guide roll 212 (FIGS. 10 and 11) which forms part of the station 24 where the folding is commenced. The pivoted support 196 supports the travelling strip for application of the adhesive thereto and has three possible positions (FIG. 17a), an elevated position X in which the travelling strip is held entirely out of contact with the adhesive-applying means, a first adhesive-applying position Y in which it holds the opposite edges of the travelling strip constantly engaged with the adhesive-applying means so as to apply adhesive continuously to these edges, and a second adhesive-applying station Z to which the travelling strip is depressed periodically into engagement with the adhesive-applying means to apply adhesive transversely thereof at spaced intervals corresponding to the length of the packages to be made. Movement of the pivoted support 196 to the several positions is provided for by a linkage consisting of a link 214 (FIGS. 12 and 13) pivotally supported on a bracket 216 at the forward end of the pivoted support 196 on the bar 200 midway between its opposite ends. A link 218 is pivotally connected at one end to the link 214 and fixed at its other end to a shaft 217. The ends of the shaft 217 are supported at one end by a bracket 219 and at the other end by an adjustable plate 221. A link 220 is fixed at one end to the shaft 217 and is pivotally connected to the protruding end of a rod 224a extending from one end of two tandemly mounted double-acting pressure-operated cylinders 222a and 222b. The double-acting cylinder 222b is pivotally connected by a rod 224b to a stud 226 bolted to the bottom of the housing 10.

Below the pivoted support 196 there is adhesive-applying means (FIGS. 16 to 19) comprising adhesive-applying rolls 228 for applying adhesive to the opposite edges of the strip and an adhesive-applying roll 230 for applying adhesive crosswise of the strip. The adhesive-applying rolls are supported above a receptacle 232 adapted to hold a quantity of liquid adhesive and to be resupplied with adhesive as the latter is depleted. The receptacle 232 is a shallow, substantially rectangular structure supported by legs 234 at the bottom of the housing and, in turn, supports in suitable bearings the adhesive-applying rolls 228 and 230. The adhesive-applying rolls 228 are mounted on a shaft 238, the ends of which are rotatably secured in bearings located in housings 240 that are also mounted on the receptacle 232. The rolls 228 are movable lengthwise of the shaft 238 to vary the distance between them according to the width of the strip to which the adhesive is to be applied and to permit positioning the rolls 228 inwardly of the edges of the strip to leave uncoated margins along the edges, corresponding substantially to the depth of the notches and providing uncoated margins for engagement with the edge guides during the partial folding of the strip as will appear hereinafter. To effect widthwise adjustment of the rolls 228, traversing devices 242 (FIG. 18) are provided. Each traversing device comprises two bushings 244, each of which is threaded on a traversing screw 246, the traversing screws being rotatably mounted in the housings 240 (FIG. 18). The traversing screws have right and left-hand threads. Two plates 248 are secured to the ends of the bushings 244 at opposite sides of each roll 228. The plates 248 contain openings through them for accommodating the shaft 238 and have thrust bearings 250 engaged with the opposite sides of each roll 228. Rotation of the traversing screws will move the traversing devices and hence the rolls 228 relative to

each other. For convenience in assembly, the traversing screws 246 are made in two parts, a right-hand part and a left-hand part, and are connected adjacent their ends. As illustrated in FIG. 16 the adjacent ends are rotatably set in couplings 273. The couplings 273 are mounted in a bracket 274 which is bolted to the bottom of the receptacle 232 by bolts 275.

Doctors blades 252 are provided for keeping the sides of the rolls 228 clean, for preventing accumulation of adhesive on the thrust bearings 250 and for controlling the thickness of the adhesive on the periphery of the rolls 228. The doctor blades 252, as shown in FIGS. 19 and 19a comprise plates that are bolted to the undersides of blocks 254. Each of the blades 252 is bent upwardly to form two spaced arms 252a that are separated by a bight 252b. The blocks 254 are pivotally mounted on the bushings 244 between the plates 248. Each block 254 has at one side an upstanding lug 256. A lug 258 is formed on that plate 248 which faces the lug 256. The lug 258 contains a threaded hole in which is mounted a screw 259 for engagement with the lug 256 on the block 254. At the other side of the block there is a pin 260. A pin 262 is fixed to the plate 248 at that side and a spring 264 is secured at its ends between the pins 260 and 262. The springs 264 hold the lugs 256 against the screws 259 and hence by adjustment of the screws the position of the doctor blade portions 252a and 252b may be adjusted. The doctor blades 252 are so adjusted that the blade arms 252a bear against the sides of the rolls 228 and are spaced a slight distance away from the bearings 250 and the blade bights 252b are spaced a slight distance away from the peripheries of the rolls 228.

The adhesive applying roll 230 is rotatably supported at its ends by a shaft 233 that is rotatable in bearings located in housings 276 that are bolted to the top of the receptacle with the roll dipping into the receptacle. A thrust bearing 231 is interposed between each housing 276 and the adjacent ends of the roll 230. As shown in FIGS. 16 and 19, a traversing screw 280, that is similar to the traversing screws 246, is rotatably mounted in bearings in the housings 276. The traversing screw 280 has left and right hand threads thereon and is formed of two parts that are connected at their adjacent ends by a coupling 280a. The coupling 280a is rotatably mounted in a bracket 280b which is bolted to the bottom of the receptacle 232 by bolts 280c.

A doctor blade 278 (FIGS. 16, 18 and 19) extends lengthwise of the roll 230 below the traversing screw 280 and is inclined downwardly toward the surface of the roll. The rear edge of the blade 278 has a pair of downwardly projecting bosses 283 containing holes 285. The blade 278 is mounted on screw bolts 287 screwed into the wall of the receptacle 232 with springs 289 disposed about the bolts between the wall and the bosses and nuts 291 are threaded on the bolts outwardly of the bosses. By rotation of the nuts 291 the blade 278 may be adjusted toward and away from the roll 230 to thereby control the thickness of the adhesive on the roll.

The right and left hand threaded portions of the traversing screw 280 each has a bushing 293a threaded thereon, and a traverse block 293 is press fitted on each bushing 293a. A wiper 279 is bolted to the underside of each block 293 by bolts 295 and each wiper rests on the doctor blade 278. The wipers 279 extend toward the roll 230 so as to engage the roll periphery immediately above the doctor blade 278 and are adapted to bear against selected portions of the roll periphery for reasons that will be explained below. The rotation of the traversing shaft 280 will move the wipers 279 lengthwise of the roll 230 towards and away from each other to adjust the position of the wipers. A hold-down bar 295a is positioned above the wiper blades 279 and is secured in the housings 276. The bar 295a precludes upward movement of the wiper blades 279 away from the doctor blade 278.

The receptacle 232 includes reinforced corners 232a 75

(see FIGS. 19 and 19b). Scrapers 281 (FIGS. 18 and 19) are mounted on spacers 281a that are supported on the corners 232a and are bolted to the corners by bolts 301 that extend through the scrapers and spacers and are threaded into the corners 232a. The scrapers are so constructed as to bear against the ends of the roll 230 and the periphery of the bearings 231 and thus prevent the accumulation of excess adhesive on these surfaces.

The applicator rolls 228 and 230 are supplied with liquid adhesive from the receptacle 232 in which they are journaled for rotation and the strip-carrying rolls 208 and 210 supported above them are so arranged as to hold the edges of the strip constantly in contact with the rolls 228 in the Y position of FIG. 17a and to intermittently press the strip to the Z position of FIG. 17a into contact with the roll 230. The sensing devices 300 (FIGS. 13, 14 and 15) cooperate with the notches P to control the movement of the pivoted support 196 for the strip carrying rolls 208 and 210 from the Y position wherein the strip is pressed against the rolls 228 to the Z position in which the strip is pressed into contact with the roll 230. The sensing devices comprise pairs of contacts 302 and 304 supported in peripherally spaced positions adjacent the surface of the support roll 210. The contacts are normally held away from the surface of the support roll 210 by the strip which passes about the roll and makes contact with the surface of the roll only when the notches move between them and the roll. The contacts 302 are rotatably supported at the ends of the arms 306, the arms being pivotally mounted on pins 308 screwed into adjustable plates 310, the latter being mounted on traverse members 312. Springs 314 connected at one end to the arms 306 and at their opposite ends to the plate 310 normally hold the contacts 302 yieldingly engaged with the strip passing over the support rolls 210 so that when a notch passes between the surface of the support roll 210 and the contacts, the latter are pressed through the notches into contact with the surface of the support roll 210. Each plate 310 has an arcuate slot 316 through it and is connected to the traverse member 312 by a pair of screw bolts 318 and 320 which enable adjustment of the plate on the traverse plate 312 and hence adjustment of the contact 302 peripherally of the support roll relative to the contact 304. The contacts 304 are rotatably mounted on the ends of arms 322, the latter being pivotally mounted by pins 324 to the traverse members and yieldably biased in a direction to hold the contacts 304 against the strip passing about the support roll 210 by springs 326 connected at one end to the arms 322 and at their other ends to the traverse members 312. A low voltage circuit (FIG. 31) is provided through the contacts and by adjusting their spacing completion of the circuit through the contacts 302 as the notches pass between them and the support roll 210 will supply pressure to the double-acting cylinder 222a so as to pull the pivoted support 196 downwardly thus pressing the strip into contact with the applicator roll 230 and passage of the notches between the surface of the support roll 210 and the contacts 304 will again complete a circuit which will supply pressure to the cylinder 222a in the direction to raise the pivoted support 196. The adhesive will be applied transversely of the width of the strip only during intervals that the pivoted support 196 is depressed and, as pointed out above, this interval may be varied in length and hence the width of the adhesive applied transversely of the strip varied by adjusting the peripheral spacing of the contacts 302 and 304. The traverse members 312 are mounted for movement lengthwise of the support roll 210 on a traverse screw 313 journaled at its ends in the bars 198. To prevent rotation of the traverse members 312 each has a pin 327 fixed in it which travels along a slot 329 in the bar 200. The traverse screw 313 has a sprocket 331 secured to one end by means of which it may be rotated to make the necessary adjustment of the contacts widthwise of the support roll 210.

The cement receptacle 232 as previously mentioned is a flat shallow tray (FIGS. 16 and 17) within which the applicator rolls dip and this receptacle is supplied with molten adhesive from a melting pot 328 mounted adjacent one side of the receptacle and above it on legs 331 in a position to supply molten adhesive gravitationally to the receptacle through a vertically disposed pipe 332, the lower end of which is adjacent the open top of the receptacle. The pipe 332 contains a valve 333 which is opened when adhesive is required in the receptacle 232 by a float 338. The pot has an inclined bottom 334 (FIG. 17) from which rises a plurality of parallel, spaced fins or ribs 336 upon which a block of adhesive may be placed for melting. Heat is supplied to the pot through resistance coils 337 which are supplied with current and kept at a substantially constant temperature by a thermal switch.

As herein illustrated, the melting pot is supported in position on a table 340. The float 338 is connected to one end of the arm 342, the latter being supported intermediate its ends on a pin 344 and balanced by a weight 346. When the adhesive has become depleted in the receptacle, the float 338 operates to energize a solenoid 347 (FIG. 16) which, in turn, opens the valve 333 thus allowing molten adhesive in the pot 328 to flow into the receptacle. The receptacle is kept hot at a constant temperature by heating coils 339 controlled by a thermal switch.

As heretofore pointed out the support 196 has a position X in which it supports the strip entirely out of contact with the applicator rolls as, for example, when the machine is not running to prevent the strip from sticking to the spaced applicator rolls 228, which have continuous contact with the opposite edge strip when the support is in the Y position for normal operation. The elevated position X has an additional purpose and that is to hold the strip entirely out of contact with both the applicator rolls 228 and 230 when a strip is used which does not require the application of adhesive, for example, a strip already printed with adhesive or one which is comprised of a thermoplastic material of the kind that can be sealed by impulses applied at ultra sonic frequencies. The elevated position of the support to the X position is provided for by supplying fluid pressure to the cylinder 222b.

The strip S leaves the rear applicator rolls 228, passes beneath the rear support roll 208 (FIG. 13) and travels vertically upward with the adhesive printed side outward over the guide roll 212 (FIG. 11) which constitutes a component of the station 24 for effecting folding of the strip. The guide roll 212 (FIG. 10) is rotatably supported on a shaft 348, the opposite ends of which are journaled in the upper ends of a pair of vertically movable bars 350 to which are attached toothed plates 352. The bars are guided for vertical movement between spaced parallel gibs 354 fastened to the housing and toothed wheels 356 mounted adjacent the opposite ends of the shaft 358 in mesh with the teeth on the plates 352 provide for elevating and depressing the bars 350 and hence the guide roll 212 relative to the top of the housing. Rotation of the shaft 358 to adjust the heightwise position of the guide roll 212 is provided for by a spindle 361 connected at one end to the shaft 358 by a sleeve 353. The other end of the spindle has on it a wheel 355 which may be grasped to turn the spindle. The guide roll 212 preferably has a surface which tapers symmetrically from its center toward its ends (FIG. 10), although a cylindrical surface of uniform diameter may be employed.

The strip S travels forwardly from the guide roll 212, that is, toward the right to the station 24 for parital folding and for disposition of articles that are to be packaged thereon. Folding is effected by drawing the strip from the guide roll 212 into engagement with a V-shaped trough 360 (FIG. 4) mounted lengthwise of the machine on the bridge 14 and extending from substantially the inner side of the housing 10 at the one end to the inner side of the housing 12 at the opposite end. The

trough has at the upper edges of its walls horizontal and vertical aprons 362 and 363 which provide support therefor on the bridge and a housing for a drive shaft which extends lengthwise of the machine from the housing 12 to the housing 10 as will appear hereinafter. Along the upper edges of the walls of the trough there are edge guides 364 comprised of strips 365 (FIG. 4a) adjustably mounted on the inner inclined walls of the trough adjacent their upper edges so as to be movable parallel thereto relative to the bottom of the trough. Slots 366 are provided in the walls of the trough for receiving adjusting bolts 367 which are screwed into backing strips 369 at the opposite sides of the walls. The inner edges of the guide strips 365 are rabbeted to provide grooves 368 for receiving the opposite edges of the strip S. By adjusting the positions of the guide strips 365 the guided edges of the strip S as they enter the trough, force the central portion of the strip S downwardly into the trough so as to conform to the cross-section of the trough, that is, to have a cross-section which is substantially V-shaped. The curved surface of the guide roll 212 assists in transforming the strips S from its flat condition to the V-shape of the trough with a minimum of puckering or wrinkling. The width of the edge guides is such as to have contact only with the uncoated margins of the strip.

As shown herein, the trough is of sufficient length to enable one or more operators standing adjacent the trough to drop articles, one such article *a* being shown in dotted lines (FIG. 4) onto the strip S as it moves along the trough at suitable intervals as determined by the spacing of the adhesive to be formed into completed packages as will be described hereinafter.

The thermoplastic adhesives used in the machine are either relatively quick setting or relatively slow setting. The quick setting adhesives have the characteristics of losing their tacky condition due to cooling between the time that the adhesive is applied to the strip and the time the strip is sealed to form packages and must be heated before the sealing operation to activate them and render them tacky. The slow setting adhesives are so constituted that they do not lose their tackiness while the strip is travelling from the place where the adhesive is applied to the strip to the place where the strip is sealed. When using a quick setting adhesive, heat is applied to activate the adhesive just as the strip leaves the trough preparatory to bringing the folded portions on the strip together for sealing and cutting up into individual packages. The activation of the adhesive is provided by means of a pair of heated plates 370 (FIGS. 20 and 21) mounted in openings 371 in the walls of the trough at the end adjacent the housing 12 so as to be movable from retracted positions to positions flush with the surfaces of the walls of the trough. Each plate 370 is secured to an arm 372 pivotally supported at 375. A motor comprising a cylinder 377 pivotally supported at 379 on the apron 363 and a rod 381 pivotally connected to the arm 372 at 383 provides for swinging each plate 370 into and out of operative position flush with the wall of the trough. The heating plates are not used when a slow setting adhesive is employed.

As the strip leaves the trough the upwardly folded portions are supported against the trough walls by guides 385 (FIG. 22) which hold the folded portions of the strip separated and prevent the strip from rising as it moves toward feed rolls 400 located on the housing 12 (FIG. 23b). The guide rods 385 (FIG. 22) are fixed to sleeves 387 mounted on screws 389 rotatably supported on the housing 12 at the end of the trough by brackets 391 secured to the end wall of the trough and a bearing block 393 secured to the top of the housing. The guide rods 385 extend inwardly toward the center line of the trough, rearwardly into the terminal end of the trough and have downwardly projecting legs 395 for engagement with the folded portions of the strip to hold the folded portions spread apart. Additional guides 385a are mounted on

screws 389a supported by posts 391a secured to the top of the housing between the end of the trough and the feed rolls 400. These additional guides are for use in holding the bottom of the V of a very wide strip in addition to the guides 385 which hold the upper portion of the strip. The guides 385a may be swung out of the way as shown in dotted lines (FIG. 20) when a narrow strip is employed. When a quick-setting adhesive is employed the guides 385 and 385a are heated by resistance heaters 385b and 385c mounted on their upper ends.

The trough is inclined from the end adjacent the guide roll 212 downwardly at a slight angle toward the feed rolls 400 and the feed rolls (FIG. 23b) are adjustable heightwise with respect to the lower end of the trough. The feed rolls are fixed to the upper ends of vertically disposed, spaced parallel shafts 402 and operate by rotational engagement with the upper edge of the strip to pull the strip through the machine. The shafts 402 (FIGS. 23 and 23b) for the feed rolls are mounted in the housing 12 in vertically disposed sleeves 404 for rotational and vertical movement within ball bearing assemblies 406 secured in the upper and lower ends of the sleeves. The sleeves are fixed to arms 403 which, in turn, are fixed to sleeves 405. The right sleeve, as shown in FIG. 23, is fixed on a vertically disposed post 407 and the left sleeve is rotatable on a similar post 407. The shafts 402 have driving pulleys P9, P10 splined to them between the lower ends of the sleeves 404 and brackets arms 410 which provide support for the undersides of the pulleys so that the shafts can be moved axially through the pulleys without displacement of the latter. The lower ends of the shafts 402 are screwed into thrust bearings 412 which rest upon the upper surfaces of plates 414, the latter being mounted on the upper ends of screws 416 by means of which they may be elevated or depressed. The screws 416 are vertically supported in bearing blocks 418 secured to the lower part 420 of a bracket 422 having a lower part 420 and an upper part 424. The bracket 422 is fastened to the side of the housing 12 by a bracket 426. Between the parts 420 and 424 sprockets 428 and 430 are splined on the screws 416. Rotation of the sprocket 430 is provided for through a chain entrained about it and the sprocket 428. A sprocket 427 on the screw below the sprocket 428 provides means for rotating the screw and to this end has on it one end of a chain, the opposite end of which is entrained about a sprocket 429 (FIG. 24). The sprocket 429 is secured to the lower end of a shaft 431 supported at its lower end by a bracket arm 433 and at its upper end in the top of the housing. A wheel 435 provides for rotating the shaft and by such rotation to raise and lower the feed roll shafts. The trough is inclined downwardly toward the feed rolls 400 so as to avoid undue wrinkling or puckering of the strip when the V-shaped strip in the trough is moved horizontally through the feed rolls and is sealed as described below. The heightwise adjustment of the feed rolls relative to the end of the trough is for the purpose of accommodating the feed rolls to different widths of strips. Parts 421 and 423, the latter being secured to the wall of the housing, provide additional support for the shafts 402. The plates 414 are connected by a part 415 welded thereto.

A sensing device is mounted adjacent the upper side of the feed rolls 400 and for convenience is supported on the upper ends of the shafts 402. The sensing device, as will appear hereinafter, by sensing the presence of the notches P at the upper edges of the folded strip, will actuate means for sealing the folded strip transversely at the intervals where the strip has been transversely coated with adhesive and is now activated. As illustrated, the upper ends of the shafts 402 (FIG. 23) are turned down and provide seats for ball bearing assemblies 432 set into a plate 434 so that the latter is supported in a substantially horizontal position on the upper ends of the shafts. One of the assemblies 432 is loosely fitted in an oversize hole in the plate 434 to permit an appreciable amount of movement between the feed wheels for slight variations in the

thickness of the strip. Movement of the feed wheels is permitted by the fact that the left sleeve 405 can pivot on the post 407.

When quick setting adhesive is employed heating elements 401 are mounted on the underside of the plate 434 above each of the feed rolls as illustrated in FIG. 29a.

The sensing device which is employed herein is similar to the kind disclosed in Patent No. 2,843,863, granted July 22, 1958 and is pneumatic in character, comprising two conductor pipes 436 and 438 arranged at opposite sides of the path of travel of the strip with their ends spaced apart to permit the strip to pass between them but in registration with each other. Air under pressure is supplied through a suitable regulator 440 (FIG. 23a) to the pipe 436. The pipe 438 is connected to a chamber 437 containing a diaphragm 442 which in turn is connected to a linkage 444, the latter being operable to close or open a switch 446. While the unnotched portion of the strip is passing between the ends of the pipes 436 and 438, the pressure in the pipe 436 is prevented from entering the pipe 438 and the diaphragm 442 at atmospheric pressure yieldably holds the linkage 444 in a position such that the switch 446 is closed. As soon as a notch passes between the ends of the pipe 436 and 438, pressure from the pipe 436 increases the pressure in the pipe 438 and thereby displaces the diaphragm so as to open the switch 446. Opening the switch operates a circuit in which there is a time delay device as will appear hereinafter, the purpose of which is to provide for movement of the strip from the sensing device into the sealing device before the sealing members are brought together to effect sealing.

At the forward side of the feed rolls 400 between the feed rolls and the sealing means there is a pair of guide rods 403 (FIGS. 23b and 29a) holding the upper edges of the folded strip as it moves toward the sealing means. These guide rods 403 are supported in the underside of the plate 434.

The sealing means is also mounted in the housing 12 forwardly of the feed rolls 400, that is, in the direction of movement of the strip through the feeding rolls. The sealing means comprise two sealing members 450 and 452 (FIGS. 23b, 24, 25 and 26) supported on the housing 12 for movement toward and away from each other substantially at right angles to the plane of the strip travelling therebetween and for reciprocable movement along the path of movement of the strip. As thus mounted, the sealing members are moved in directions that have components parallel to the path of movement of the strip and inward movement toward each other. The sealing members do not engage the strip as a result of their inward components of movement until their component of movement in the direction parallel to the path of movement of the strip is substantially equal to the speed of the strip. The engagement of the sealing members with the strip serves to press the folded portions of the strip together and thus effects sealing of the folded portions by way of the transverse ribbons of adhesive. Cutting elements carried by the sealing members effect cutting the strip within the sealed areas transversely of the strip to thereby form packages. The members 450 and 452 are respectively secured to arms 454 and 456. Each of the arms 454 and 456 has depending offset spaced limbs 453 and 455 which support bearings 460 and 462. The bearings 460 and 462 receive a horizontally disposed shaft 464. In FIG. 26, the limbs 453 and 455 of the arm 456 are shown while the limbs 453 and 455 of the arm 454 are not visible. The shaft 464 is supported in hanger bearings 466 and 468 at the underside of the top of the housing 12 and at a sufficient spacing to permit reciprocable movement of the sealing members. A carriage 470 (FIG. 26) containing axially aligned holes 472 for receiving the shaft 464, is mounted on the latter between the two limbs 453 and embraces the bearings 462. On top of the carriage at opposite sides there are secured vertically disposed pins 474 and 476 on which there are rotatably mounted rollers

478 and 480 which engage opposite sides of a rigid guide bar 482 situated between the arms 454 and 456. The guide bar 482 is part of the hanger bearings 466, 468. The guide rolls 478 and 480, by engagement with the opposite sides of the guide bar 482, support the carriage 470 in a fixed vertical position on the shaft 464. The lower side of the carriage 470 has on it a boss 484 within which there is secured a downwardly projecting pin 486 on which there is mounted a follower 488. The follower 488 is engaged within a cam groove 490 formed on the upper face of a cam plate 492 (FIG. 24), the latter being fixed to the upper end of a shaft 494 so as to rotate about a vertical axis. The cam groove 490 is designed, by rotation of the cam plate 492 through one complete revolution, to effect linear movement of the carriage and hence of the arms supporting the sealing members, commencing from a standstill up to the speed of the strip and then to return it to its initial position of rest. A one-revolution clutch 496 is provided for the purpose of effecting rotation of the shaft 494 one revolution. The engagement of the bearings 462 with the carriage effects the carriage linear movement. The arms 453 and bearings 460 are for purposes of stability.

Movement of the sealing members into engagement with the strip to effect the necessary pressure for sealing is achieved by fluid operable cylinders 497 and 498 pivotally mounted at 500 and 502 between the ends of spaced plates 504 and 506 bolted transversely of the axis of the shaft 464 to the lower side of the carriage 470. Each cylinder 497, 498 has protruding from it a rod 508, 510 respectively. Each arm 454, 456 contains a slot 512, 514 within which the distal ends of the rods 508 and 510 are pivotally secured by pins 516, 518. Spaced parallel plates 520 and 522 are connected to the upper ends of the arms 454 and 456 by pins 521 and 523 and the sealing members 450 and 452 are rigidly secured between the plates 520 and 522 by bolts 525 and 527.

The lower ends of the cylinders 497 and 498 are normally supplied with a low pressure fluid which urges the sealing members 450 and 452 toward each other. However, they are held separated in opposition to this low pressure while they are in their inoperative position and during their initial movement up to the speed of the strip preparatory to clamping by means of cams 507 and 509 (FIGS. 24 and 26c). The cams 507 and 509 are bolted to the top of the housing 12 and extend lengthwise of the path of movement of the carriage 470. Cam followers 511 and 513 (FIGS. 24 and 26) rotatably mounted on brackets 526 and 528 bolted to the lower ends of the sealing members 450 and 452 by engagement with the cams 507 and 509 hold the arms 454 and 456 supporting the sealing members spaced from each other until they obtain a speed corresponding to that of the strip where the cams terminate and the sealing members are allowed to come together into engagement with the opposite sides of the strip.

At the instant of movement of the sealing members together there is means for sensing the presence of an article between the sealing members which would interfere with its complete closing and possible damage not only to the article but to the sealing members themselves. This means takes the form of two contact elements 530 and 532 (FIG. 27) which when brought into contact with each other by complete closing of the sealing members, will establish a circuit which will result in supplying high pressure air to the cylinders 497 and 498 for the purpose of effecting sealing. If the sealing members do not move together sufficiently to engage these contacts because of some object between the sealing member other than the folded strip, the circuit will not be made and the high pressure air will not be supplied to the cylinders 497 and 498. The contacts 530 and 532 are mounted on flexible fingers 531 and 533 secured, respectively, to the upper ends of the sealing members 450 and 452.

The opposed faces of the sealing members are grooved

at their opposite sides (FIGS. 27 and 28) so as to provide relatively narrow pressure-applying lands 534 and 536 of approximately the width of the strip of adhesive applied to the folded portions of the strip S. The lands 534 contain lengthwise thereof recesses 534a on which are cemented rubber or equivalent yieldable strips 534b.

The sealing member 450 is comprised of two blocks 540 and 542 secured to each other by fastening means in the form of bolts 546 with a cutting blade 548 mounted between them. The cutting blade 548 (FIG. 28) is desirably movable between the plates so as to provide a slicing action as the cut is made and to this end is slidably supported between a pair of face plates 550 and 552 held spaced from each other by a separator 554. Two assembly bolts 556 having heads 558 recessed in the face plate 552 extend through inclined slots 549 (FIG. 25) in the blade 548, through the face plate 550 and through holes 560 in the block 540. Rollers 561, slidable in the slots 549, embrace the bolts 556 between the plates 550 and 552. Sleeves 62 are screwed into the holes 560 over the bolts 556 against the outer ends of springs 564, the inner ends of which bear against spacers 563 next to the blade. The spacers 563 yieldably press the blade toward the face plate 552. The inclined slot 549 at the top is set closer to the inner face of the block 542 than the lower one so that the cutting edge of the blade is inclined slightly toward the opposite sealing member from bottom to top thus providing for better slicing action. The flat side of the blade has at the top a slight bevel so that it overlaps a fixed cutter blade 580 in the opposite sealing member 452 as shown in FIG. 25a. Caps 566 are fitted over the outer ends of the screw-threaded sleeves 562 and are connected to the bolts 566 by pins 568. By pulling the bolts 556 outwardly the blade may be released for replacement. The blade has at its lower end a bracket 565 (FIGS. 25 and 26a) on which there is mounted a roller 567. A cam bar 569 is pivotally mounted on the guide bar 482 in a slot 483 along the path of movement of the carriage 470 and normally occupies a position such as to raise the roller 567 at the moment of sealing to elevate the cutting blade in shearing action to cut through the sealed area. The cam bar 569 is normally held in operative position by engagement of its distal end 571 with the inclined end 573 of a bar 575 slidable along the slot 483 as shown in dotted lines in FIG. 26a. In the event that high pressure fails to be supplied to the cylinders, the bar 575 is retracted allowing the cam bar 569 to drop down into the slot and hence to permit the roller 567 to pass over it without operating the cutter blade 548. The bar 575 is retracted by an arm 577 (FIG. 26b). The arm 577 is pivotally connected to an arm 579. The arm 579 is fixed to a shaft which has fixed to it an arm 581, the latter being connected by a rod 583 to a solenoid K mounted on the housing 12. The solenoid is energized to hold the bar 575 in operative position. When the high pressure fails to be delivered to the cylinders, de-energization of the solenoid allows a spring 583a to pull the cam bar 575 to an inoperative position.

The sealing member 452 comprises blocks 570 and 572 secured together by bolts 561 with a spacer 574 therebetween. Within the space provided by the spacer there is an L-shaped part 576, an edge of which coincides with the inner face of the sealing member and which contains a groove 578 lengthwise thereof within which there is seated a cutting blade 580. The L-shaped part 576 is held in place by bolts 585 and these may be readily removed for replacement of the block 580. A keeper plate 582 is fastened in the groove 578 over the cutting blade 580 by screws 584. Screws 583 are threaded into the block 572 against the fixed blade 580 to provide for adjusting the later relative to the movable blade and to straighten the fixed blade.

To insure accuracy of shearing engagement with the cutting blade 548 with the cutting blade 580 when the sealing members 450 and 452 are brought together, rollers 586 and 588 are mounted on the upper end of the sealing

member 450 and guide fingers 590 and 592 are bolted to the upper end of the sealing member 452, the guide fingers being operable, by engagement as they are moved past the rollers to align the cutting blades.

If a slow setting adhesive is employed, the sealing members 450 and 452 are not heated. However, heating coils 587 are provided in the sealing members in the event that heat is required for a quick setting adhesive.

The apparatus is driven by a motor M (FIG. 24) mounted within the housing 12 which has on it a pulley PM drivably connected to a pulley PR on a gear reducer R by a belt. The gear reducer has an output shaft 600 on which there is a pulley P1. The pulley P1 is connected by a belt to a pulley P2 (FIG. 23) fixed to the lower end of a jack shaft 602 supported in a vertical position in bearings 604 and 606. A pulley P3 is fixed to the jack shaft 602 and is connected by a belt to a pulley P4 mounted on a second jack shaft 608 (FIG. 29) parallel to the shaft 602. The lower end of the jack shaft 608 has fixed to it a pulley P5 and this is connected to a pulley P6, the latter being mounted on the lower end of one of two vertically disposed parallel shafts 610 and 612 mounted in suitable bearings. A pair of meshing gears 614 and 616, mounted on the shafts 610 and 612, connect them together so that the shaft 610 drives the shaft 612. The shafts 610 and 612 have at their upper ends pulleys P7 and P8 which are connected, respectively, by belts to the pulleys P9 and P10 mounted on the shafts 402 which drive the feed rolls 400 (FIG. 23).

The jack shaft 602 also has fast to it a pulley P11 (FIG. 23) and this pulley is connected to a pulley P12 (FIG. 24) secured to a shaft 613, the latter being connected by the one-revolution clutch 496 to the shaft 494 of the cam plate 492 which effects reciprocation of the sealing members. Operation of the clutch 496 periodically connects the cam plate to the drive for one rotation of the cam plate and then disconnects it.

The upper end of the jack shaft 608 has pinned to it a pinion gear 615 (FIG. 29) which meshes with a pinion gear 618, the latter being fastened to one end of a horizontally disposed shaft 620 which extends from the housing 12 rearwardly to the housing 10 (see FIG. 4). The end of the shaft 620 which enters the housing 10 has fixed to it a pinion gear 622 (FIGS. 10 and 11) and this in turn meshes with a pinion gear 624 fixed to the horizontally disposed shaft 86 which extends transversely of the housing and supports the platen roll 80 for rotation. The shaft 86 has on it a pulley P14 (FIGS. 10 and 17b) which is connected by a belt to a pulley P15, the latter being fastened to the shaft 233 supporting the roll 230 so as to effect rotation thereof. The shaft 233 has on it a gear 632 which through an idler 630 in mesh therewith drives a gear 628 fixed to the shaft 238, on which are mounted the rolls 228.

The shaft 86 also has fast to it a pulley P16 which is connected by a belt to a pulley P17, the latter being fast on the shaft 164 which drives the cams 162 for effecting reciprocation of the indicia-applying means. The pulley P17 effects rotation of the shaft through the one-revolution clutch 172.

Finally, the shaft 86 has on it a pulley P18 which is connected by a belt to a pulley P19 fast to the shaft 195 which supports the roll 194.

There is provision for adjusting the various mechanisms making up the apparatus to take care of differences in width of the strip material of which the packages are formed as shown in FIG. 17c.

As illustrated, shaft 202 has on its outer end a wheel 800 (FIG. 12) by means of which it may be rotated and within the housing on the shaft there are three sprockets 802, 804 and 806. A chain connects the sprocket 802 to the sprocket 331 on the screws 313 thus providing for adjustment of the sensing contacts 302 and 304. The sprocket 804 is connected by a chain to a sprocket 808 on the first of the screws 246 (FIG. 16). A second sprocket 810 on

the first screw 246 is connected by a chain to a sprocket 812 on the second of the screws 246. A second sprocket 814 on the second of the screws 246 is connected by a chain to a sprocket 816 on the screw 280. This provides for adjustment of the rolls 228 and the wipers 279. A chain extends from the sprocket 806 about the sprocket 58 on the shaft 53, (FIG. 5) an idler sprocket 818 and a sprocket 820 on a shaft 822. The shaft 822 has on it a sprocket 824 and this is connected by a chain to an idler sprocket 826. One run of the chain extending about the sprockets 824 and 826 engages the sprocket 142 on the shaft 138 (FIG. 10) which moves the punch blocks 144 along the shaft 134. This latter construction is provided to permit the carriage 128 to be reciprocated and at the same time to enable adjustment of the punch blocks. The single wheel 800 enables adjustment of all the mechanisms simultaneously.

A sprocket 900 mounted to rotate with the shaft 494 that is driven by the one revolution clutch 496 is connected by a chain to a sprocket 902 that is mounted to rotate with a shaft 904 (FIG. 24). The shaft 904 is rotatable in the casing 12. Four adjustable cams 906, 908, 910 and 912 are mounted on the shaft 904 to rotate therewith. The cams each have cam lobes thereon so constructed as to respectively engage the actuators of switches SX, 916, S11 and S12 during a portion of each revolution of the shaft 904. The switches are mounted on bracket 922 that is secured to the casing 12.

Referring to FIG. 30 which shows a relatively high voltage circuit operated from lines L1 and L2, to start the machine, a starting button PB4 is pressed to close a switch S3 that is mechanically connected to the button PB4 for movement therewith and to energize a coil in a relay CR2. The closing of the switch S3 causes the energization of a coil in a relay SR. The energization of this relay causes the closing of a switch SR1 in the relay to establish a holding circuit to the coil and enable the coil to remain energized when the switch S3 is released. The energization of the coil of the relay SR also closes a normally open switch SR2 in the relay SR to thereby energize the coil of a relay CR3. The energization of this relay causes the closing of a normally open switch 922 in the relay CR3 to thereby turn on the motor M. The turning on of the motor causes the rolls 80 and 400 to feed the paper through the machine and rotates the cement applying rolls 228 and 230. The closing of the switch PB4 energizes the coil of a relay CR2 which causes the closure of a normally open switch SCRO in this relay to thereby establish a holding circuit to the coil of the relay CR2 when the button PB4 is released. The purpose of this portion of the circuit will be referred to below.

The bevel gear 624 has on its hub three equally spaced nubs 830 (FIG. 10) located so as to close a normally open switch S7 when the shaft 86 is rotated by the motor M. The switch S7 is mounted on the housing 10. Hence when the motor M through the gearing arrangement described above effects rotation of the shaft 86 one complete turn, the switch S7 is momentarily closed three times. Each time the switch S7 is momentarily closed, a pair of coils CT1 and CT2 in a counter C is momentarily energized. The counter C is a standard commercial item that is so constructed that after its coils CT1 and CT2 have been energized a predetermined number of times, it is activated by one of two switches SCT1 and SCT2 in the counter closing to energize a solenoid SCR1. Following the energization of the solenoid SCR1, the next momentary energization of coils CT1 and CT2 causes the opening of the switch SCT1 or SCT2 that had been closed to deenergize the solenoid SCR1. The above-described energization and deenergization of the solenoid SCR1 is repeated when the coils CT1 and CT2 have again been momentarily energized the predetermined number of times. The counter C may be adjusted to vary the predetermined number of energizations of its coils CT1 and CT2 that are required to energize the solenoid SCR1.

Referring to FIGS. 10 and 11, each time the solenoid SCR1 is energized, the one-revolution clutch 172 is caused to rotate the shaft 164 through one revolution. The rotation of the shaft 164 through one revolution drives the indicia-forming means as heretofore described to form notches at the edge of the strip whose spacing lengthwise of the strip is determined by the setting of the counter. Therefore the lengthwise spacing of the indicia may be varied by adjusting the counter.

The machine control includes a low voltage circuit shown in FIG. 31 that is operated from lines L3 and L4. When a set of notches reaches the adhesive applying station the contacts 302 come into engagement with the roll 210 to thereby energize the coil 924 of a relay PBR1. The energization of this coil causes a single pole double throw switch 926 in the relay PBR1 to move from contact S9 to contact S8 and thereby deenergize a solenoid PR2 and energize a solenoid PR1 (FIG. 30). As shown in FIG. 32, prior to the movement of the switch 926, the energization of solenoid PR2 had caused pressurized air to pass from a source of air under pressure (not shown) through a valve 928, actuated by the solenoid PR2, to the cylinder 222a to shift the rod 224a leftwardly (FIGS. 13 and 32) to maintain the roll 210 out of adhesive applying relationship with respect to the roll 230. The concomitant energization of solenoid PR1 and deenergization of solenoid PR2 causes the pressurized air to pass through a valve 930 to shift the rod 224a rightwardly to thereby lower the roll 210 and cause a transverse ribbon of adhesive to be applied to the strip S. The aforesaid energization of the coil 924 also closes a normally open switch 932 in the relay PBR1 to establish a holding circuit through a normally closed switch 934 in a relay PBR2 to maintain the switch 926 closed through its contact S8 after the notches in the strip have passed the contacts 302. The passage of the notches P past the contacts 304 (FIG. 14) causes the coil 936 of the relay PBR2 to be momentarily energized to quickly open and close the switch 934 and thereby break the holding circuit to the coil 924 and reenergize solenoid PR2 and deenergize solenoid PR1 so as to cause the cylinder 222a to elevate the roll 210 out of adhesive applying position.

When the notches P on the folded strip reach the feeding rolls 400 to actuate the pneumatic sensing device described heretofore, the switch 446 is momentarily opened. This momentary opening of the switch 446 momentarily deenergizes the coil 938 of a relay PBR3 in the low voltage circuit (FIG. 31). The momentary deenergization of the coil 938 causes a heretofore open switch 940 in the relay PBR3 to momentarily close. The momentary closure of the switch 940 energizes a coil 942 in a timer TDR in the high voltage circuit (FIG. 30). The timer TDR is a standard commercial item that is constructed so as to cause a switch 944 in the timer to close an adjustable predetermined time interval after the coil 942 is energized and to close a switch 948 in the timer in response to the energization of the coil 942 to thereby establish a holding circuit to the coil 942. The switch 948 reopens after the lapse of the adjustable predetermined time interval. The closure of the switch 944 and the substantially simultaneous opening of the switch 948 at the end of the time interval causes a momentary energization of a coil 946 in the timer TDR to thereby momentarily close a switch STDR in the timer which in turn causes a momentary energization of a solenoid SCR2. The momentary energization of the solenoid SCR2 actuates the one revolution clutch 496 to cause the aforesaid movement of the sealing members 450 and 452 (FIG. 24). The purpose of the adjustable time delay is to delay initiation of operation of the one revolution clutch until the strip has moved from the feed rolls 400 up to the sealing members 450 and 452 and this time delay is dependent on the speed of the strip. The rotation of the one revolution clutch causes a rotation of the shaft 904 through one revolution (FIG. 24).

As shown in FIG. 33, air is normally supplied to the cylinders 497, 498 to raise the rods 508, 510 under relatively low pressure from the source of pressurized air (not shown) through a line 950, a low pressure regulator 952 and a four way solenoid actuated valve 954. The valve 954 is controlled by two solenoids PA1 and PA2. Normally the solenoid PA1 is energized and the solenoid PA2 is deenergized to permit the air to pass through the valve 954 as described. The aforesaid cam 910 is so constructed as to maintain the switch S11 normally open and to close it for a short period during the one revolution rotation of the shaft 904. As the sealing members 450, 452 move forwardly by reason of the actuation of the clutch 496 and attain the speed of the strip, they come together under the low pressure. When the sealing members come together so that the contacts 530, 532 (FIG. 27) engage, the coil 956 of a relay PBR4 in the low voltage circuit is energized to close normally open switches S10 and S13 in this relay. At about this time, the cam 910 causes the closure of the switch S11 to thereby energize a solenoid DA1 (FIGS. 30 and 33). The energization of the solenoid DA1 causes the opening of a normally closed valve 958 to enable air under full line pressure to pass from the source through the valve 958, a line 960 and the valve 954 to supply air under full line pressure to the cylinders 497, 498 to effect transverse sealing of the strip. After the completion of sealing, the cam operated switch S11 is opened to shut off the full line pressure to the cylinders 497, 498. If the contacts 530 and 532 do not come together, the solenoid DA1 is not energized to supply the full line pressure to the cylinders 497 and 498 even though the cam operated switch S11 is closed.

As stated above, the energization of the coil 956 of the relay PBR4 in response to the engagement of the contacts 530, 532 also caused the normally open switch S13 to close (FIG. 31). The switch S12 controlled by the cam 912 is normally closed and remains closed during most of the one revolution of rotation of the shaft 904. The cam 912 is so constructed as to open the switch S12 at about the time that the contacts 530, 532 would normally come into engagement and to close the switch S12 shortly before the contacts 530, 532 would normally disengage. As shown in FIG. 30, the switches S12 and S13 are in parallel so that closure of either of these switches causes the solenoid K to be energized and the arm 569 to be in cutter blade operating position (FIG. 26a). Should the contacts 530, 532 not engage, the switches S12 and S13 will both be open so that the cutter blade will not be actuated during the pressing engagement of the sealing members.

The switch 916 is a single pole double throw switch having contacts S30 and S31 (FIG. 30). In the condition of the machine when the shaft 904 is normally not rotating, contact S30 is closed and contact S31 is open to thereby energize solenoid PA1 and deenergize solenoid PA2 so that the pressurized air passes from the valve 954 to the cylinders 497, 498 to raise the rods 508 and 510 and thereby urge the sealing members toward each other. The cam 908 is so constructed that during the major part of the first half of the revolution of the shaft 904 in response to actuation of the one revolution clutch 496 when the sealing members are moving forwardly the contact S30 of the switch 916 remains closed. Before the sealing members reach their forwardmost position, but after they have sealed and cut the strip and after the application of the air under full line pressure, the cam 908 causes the contact S30 of the switch 916 to open and the contact S31 of this switch to close. This causes the concurrent energization of the solenoid PA2 and deenergization of the solenoid PA1 resulting in a shifting of the valve 954 so that the pressurized air passes from the valve 954 through a line 962 to enter the cylinders 497, 498 in a direction to lower the rods 508, 510 and thus urge the sealing members away from

each other. Towards the end of the retractive movement of the sealing members the cam 908 again causes the switch contact S30 of switch 916 to be closed and the switch contact S31 of this switch to be opened to return the parts to the position they assumed before the shaft 904 was caused to rotate in response to actuation of the one revolution clutch 496.

The switch CY (FIG. 30) is for the purpose of shutting off the machine and is normally closed. The switch LSO is normally closed until the paper supply runs low and needs to be replenished. It is desired when either of these switches are opened for the machine to stop at the end of a normal package making cycle with the sealing members in their retracted position. To accomplish this end the energization of the aforementioned coil of the relay CR2 also opens a normally closed switch SCR2 in the relay. The switch SCR2 is in series with the switch SX controlled by the cam 906. The cam 906 is so constructed that during a single revolution of the shaft 904, the switch SX is open when the shaft starts rotating in response to actuation of the one revolution clutch 496, closes shortly before the shaft 904 completes its revolution and reopens by the time the shaft completes its revolution. The switches SCR2 and SX are in series with the coil 964 of a relay CR1. The energization of the coil 964 acts to open a normally closed switch SCR1. As can be seen in FIG. 30, the closing of both the switches SCR2 and SX energizes the coil 964 to open the switch SCR1. This causes the deenergization of the coil of the relay SR to open the switch SR2 and thus deenergize the coil of the relay CR3. The deenergization of the coil of the relay CR3 opens the switch 922 to shut off the motor M. The switch SCR2 is opened by either opening the switch LSO or the switch CY to open the circuit to the switch SCRO and deenergize the coil of the relay CR2. The switch SX is closed by the cam 906 toward the end of a machine cycle. Therefore the motor M can shut off to stop the machine in response to the opening of either switch CY or switch LSO only when the machine has completed a package making operation and the sealing members 450, 452 are in their retracted position.

The machine control also incorporates emergency switches (not shown) that can be actuated to stop the machine at any time during its cycle.

The machine control further incorporates jogging switches (not shown) that are depressible to move the machine parts only so long as the switches remain depressed.

To summarize the operation of the machine, the continuously moving strip S is unwound from the roll 16 and passes through the printing station 18 where the roll 82 prints information on the top of the strip S (FIG. 6) at spaced intervals which information subsequently appears on the outside of each formed package.

From the printing station 18 the strip passes to the indicia applying station 20 where the notches P (FIG. 23c) are applied to the marginal edges of the strip at spaced intervals. The spacing of the notches lengthwise of the strip is determined by the setting of the timer C. Therefore, the setting of the timer C determines the length of the packages formed in the machine.

From the indicia applying station 20 the strip passes to the adhesive applying station 22. At this station the rolls 228 apply longitudinal ribbons of adhesive 964 (FIG. 23c) running lengthwise of the strip and spaced a short distance from the margins of the strip so as to be inwardly of the notches P. It is desirable not to have the ribbons 964 overlap the notches P so as to preclude having the adhesive ride out of the notches and splatter on the machine parts. The roll 210 is periodically lowered and raised at the station 22 in response to the movement of the notches P past the contacts 302, 304 to apply the transverse ribbons of adhesive 966 (FIG. 23c) to the strip with the transverse ribbons extending between the

longitudinal ribbons 964. The spacing between the transverse ribbons 966 is equal to the spacing lengthwise of the strip of the notches P. As aforesaid, the ribbons 966 are applied to the strip S as a result of the lowering of the roll 210 (FIG. 13) to press the moving strip against the roll 230. The width of the ribbon 966 is determined by the wipers 279 which are adjusted to bear against those portions of the periphery of the roll 230 that overlap the margins 968 of the strip S as indicated in FIG. 16 where the margins 968 of the strip are shown in dot-dash lines. Therefore the peripheral portions of the roll 230 that bear against the margins of the strip do not have adhesive thereon.

From the adhesive applying station 22 the strip S passes to the folding station 24 where the strip is partially folded into a contour that is substantially V-shaped in cross-section as indicated in FIG. 4. While the strip is passing through the folding station an article *a* is deposited thereon in each of the rectangles formed by the longitudinal ribbons 964 and transverse ribbons 966 (FIGS. 4 and 34).

From the folding station 24, the strip S passes to the final folding station 26 where the margins of the strip pass between the feed rolls 400 which serve to feed the strip through the machine. The feed rolls 400 also serve to force the longitudinal ribbons of adhesive 964 against each other to thereby adhesively bond the tops of the packages (see FIGS. 35 and 35a).

From the final folding station 26 the strip S passes to the sealing and cutting station 28. As the strip passes between the feed rolls 400, the notches P are presented between the pipes 436 and 438 (FIGS. 35 and 35a). As described above, this results in the sealing members 450 and 452 moving, after a suitable time delay, in the direction of movement of the strip and also moving toward each other under relatively low pressure. The sealing members engage the opposite sides of the strip in the regions of the transverse adhesive ribbons 966 (FIG. 36) and as they do so the contacts 530, 532 engage to cause the sealing members to apply relatively high pressure to the strip and cause the folded walls of the strip to be adhesively bonded to each other by way of the transverse ribbons 966. At this time the strip is severed into package lengths midway of the transverse adhesive ribbons 966 by the cutter blade 548 operating along the line 970 shown in FIG. 36. Should an article *a* be inadvertently placed on the strip so as to straddle a transverse adhesive ribbon 966, then the contacts 530, 532 will not engage, the relatively high pressure will not be applied to the sealing members and the cutting blade will not be actuated.

The illustrative embodiment of the invention shows the machine as forming indicia in the form of notches on the margins of the strip and shows the indicia as controlling the spacing of the transverse adhesive ribbons, the application of the sealing instrumentalities to press the transverse adhesive ribbons against each other and the cutting of the strip into package lengths midway of the transverse adhesive ribbons. It should be understood that the invention in its broadest aspects contemplates forming indicia other than notches on the strip (such as, for example, black dots) and that other sealing instrumentalities than those disclosed may be utilized to seal and/or cut the strip transversely to form the packages (such as a conventional ultrasonic sealing instrumentality that operates by impulses applied at ultrasonic frequencies to fuse a strip made of a thermoplastic material such as polypropylene film).

The present disclosure is for the purpose of illustration only and it should be understood that this invention includes all modification and equivalents that fall within the scope of the appended claims.

We claim:

1. A machine for making packages from a strip by effecting a package forming operation on the strip at

spaced intervals comprising: indicia forming means for forming indicia on the strip; package forming means for effecting said package forming operation; feeding means for feeding the strip in a prescribed path from a supply past the indicia forming means and from the indicia forming means past the package forming means; first control means operative to actuate the indicia forming means in response to the feeding of predetermined increments of the strip to thereby form the indicia on the strip at predetermined spaced intervals; second control means, actuable to operate the package forming means, so positioned alongside said prescribed path as to intersect said indicia; means responsive to the intersection of the indicia with the second control means to effect actuation of the package forming means; and means to adjust the first control means to adjust the extent of the predetermined increments that are operative to actuate the first control means.

2. The machine as defined in claim 1 wherein said indicia forming means comprises punches operative to form notches on the strip on its opposite longitudinal edges.

3. The machine as defined in claim 1 wherein said first control means comprises: an adjustable counter that is operatively connected to the indicia forming means to actuate the indicia forming means in response to activation of the counter; and means operatively connecting the counter to the strip feeding means for activating the counter in response to the feeding of said predetermined increments, the extent of said predetermined increments being dependent on the adjustment of the counter.

4. A machine for making packages from a strip by transversely sealing two walls of the strip at spaced intervals comprising: indicia forming means for forming indicia on the strip; sealing means for effecting said transverse sealing; feeding means for feeding the strip in a prescribed path from a supply past the indicia forming means and from the indicia forming means past the sealing means; first control means operative to actuate the indicia forming means in response to the feeding of predetermined increments of the strip to thereby form the indicia on the strip at predetermined spaced intervals; second control means, actuable to operate the sealing means, so positioned alongside said prescribed path as to intersect said indicia; means responsive to the intersection of the indicia with the second control means to effect actuation of the sealing means; and means to adjust the first control means to adjust the extent of the predetermined increments that are operative to actuate the first control means.

5. The machine as defined in claim 4 wherein said indicia forming means comprises punches operative to form notches on the strip on its opposite longitudinal edges.

6. The machine as defined in claim 4 wherein said first control means comprises: an adjustable counter that is operatively connected to the indicia forming means to actuate the indicia forming means in response to activation of the counter; and means operatively connecting the counter to the strip feeding means for activating the counter in response to the feeding of said predetermined increments, the extent of said predetermined increments being dependent on the adjustment of the counter.

7. The machine as defined in claim 4 further comprising: severing means operative concomitantly with the sealing means for transversely severing the strip in the regions of the strip sealed by the sealing means.

8. A machine for making packages from a strip by transversely sealing the walls of a folded strip at spaced intervals comprising: indicia forming means for forming indicia on the strip; folding means for folding the strip longitudinally; sealing means for effecting said transverse sealing; feeding means for feeding the strip in a prescribed path from a supply past the indicia forming means, from the indicia forming means through the folding means, and from the folding means past the sealing means; first control means operative to actuate the indicia forming

means in response to the feeding of predetermined increments of the strip to thereby form indicia on the strip at predetermined spaced intervals; second control means, actuable to operate the sealing means, so positioned alongside said prescribed path as to intersect said indicia; means responsive to the intersection of the indicia with the second control means to effect actuation of the sealing means; and means to adjust the first control means to adjust the extent of the predetermined increments that are operative to actuate the first control means.

9. The machine as defined in claim 8 wherein said indicia forming means comprises: punches operative to form notches on the strip on its opposite longitudinal edges.

10. The machine as defined in claim 8 wherein said first control means comprises: an adjustable counter that is operatively connected to the indicia forming means to actuate the indicia forming means in response to activation of the counter; and means operatively connecting the counter to the strip feeding means for activating the counter in response to the feeding of said predetermined increments, the extent of said predetermined increments being dependent on the adjustment of the counter.

11. The machine as defined in claim 8 further comprising: severing means operative concomitantly with the sealing means for transversely severing the strip in the region of the strip sealed by the sealing means.

12. A machine for making packages from a strip by transversely sealing the walls of a folded strip at spaced intervals comprising: indicia forming means for forming indicia on the strip; adhesive applying means for applying transverse ribbons of adhesive to the strip; folding means for folding the strip longitudinally; sealing means for effecting said transverse sealing by applying pressure to the regions of the strip in which the transverse ribbons are applied; feeding means for feeding the strip in a prescribed path from a supply past the indicia forming means, from the indicia forming means past the adhesive applying means, from the adhesive applying means through the folding means, and from the folding means past the sealing means; first control means operative to actuate the indicia forming means in response to the feeding of predetermined increments of the strip to thereby form the indicia on the strip at predetermined spaced intervals; second control means, actuable to operate the adhesive applying means, so positioned alongside said prescribed path as to intersect said indicia; third control means, actuable to actuate the sealing means, so positioned alongside said prescribed path as to intersect said indicia; means responsive to the intersection of the indicia with the second control means to effect actuation of the adhesive applying means; and means responsive to the intersection of the indicia with the third control means to effect actuation of the sealing means.

13. The machine as defined in claim 12 wherein said indicia forming means comprises punches operative to form notches on the strip on its opposite longitudinal edges.

14. The machine as defined in claim 12 further comprising: means to adjust the first control means to adjust the extent of the predetermined increments that are operative to actuate the first control means.

15. The machine as defined in claim 14 wherein said first control means comprises: an adjustable counter that is operatively connected to the indicia forming means to actuate the indicia forming means in response to activation of the counter; and means operatively connecting the counter to the strip feeding means for activating the counter in response to the feeding of said predetermined increments, the extent of said predetermined increments being dependent on the adjustment of the counter.

16. The machine as defined in claim 12 further comprising: severing means operative concomitantly with the sealing means for transversely severing the strip in the region of the strip sealed by the sealing means.

17. A machine for making packages from a strip by

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longitudinally sealing the walls of a strip that is folded at its bottom and by transversely sealing the walls of the folded strip comprising: indicia forming means for forming indicia on the strip; first adhesive applying means for applying transverse ribbons of adhesive to the strip; second adhesive applying means for applying a continuous longitudinal ribbon of adhesive to at least one of the strip walls; folding means for folding the strip longitudinally at its bottom; transverse sealing means for effecting said transverse sealing by applying pressure to the regions of the strip in which the transverse ribbons are applied; feeding means for feeding the strip in a prescribed path from a supply past the indicia forming means, from the indicia forming means past both of said adhesive applying means, from the adhesive applying means through the folding means, and from the folding means past the sealing means, said feeding means including feeding instrumentalities located between the folding means and the sealing means positioned to seal the strip walls by applying pressure to the regions of the strip in which the longitudinal ribbons are applied; first control means operative to actuate the indicia forming means in response to the feeding of predetermined increments of the strip to thereby form the indicia on the strip at predetermined spaced intervals; second control means, actuable to operate the adhesive applying means, so positioned alongside said prescribed path as to intersect said indicia; third control means, actuable to actuate the transverse sealing means, so positioned alongside said prescribed path as to intersect said indicia; means responsive to the intersection of the indicia with the second control means to effect actuation of the first adhesive applying means; and means responsive to the intersection of the indicia with the third control means to effect actuation of the transverse sealing means.

18. The machine as defined in claim 17 wherein said indicia forming means comprises punches operative to form notches on the strip on its opposite longitudinal edges.

19. The machine as defined in claim 17 further comprising: means to adjust the first control means to adjust the extent of the predetermined increments that are operative to actuate the first control means.

20. The machine as defined in claim 19 wherein said first control means comprises: an adjustable counter that

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is operatively connected to the indicia forming means to actuate the indicia forming means in response to activation of the counter; and means operatively connecting the counter to the strip feeding means for activating the counter in response to the feeding of said predetermined increments, the extent of said predetermined increments being dependent on the adjustment of the counter.

21. The machine as defined in claim 17 further comprising: severing means operative concomitantly with the transverse sealing means for transversely severing the strip in the regions of the strip sealed by the transverse sealing means.

22. A mechanism for forming indicia on a strip comprising: feeding means for feeding the strip through a prescribed path; an indicia forming tool positioned alongside said path; drive means actuable to cause the tool to form indicia on the strip; an adjustable counter, that comprises a coil that activates the counter in response to a predetermined number of energizations, operatively connected to the indicia forming means to actuate the drive means in response to activation of the counter; a hub operatively connected to the strip feeding means so as to rotate in unison with the operation of the strip feeding means; a switch located adjacent the hub; at least one switch actuator mounted on the hub for momentarily actuating the switch during each revolution of the hub; and means interconnecting the switch and the counter to momentarily energize the coil each time the switch is actuated; whereby the extent of said predetermined increments is dependent on the adjustment of the counter to set the number of energizations of the coil needed to activate the counter.

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